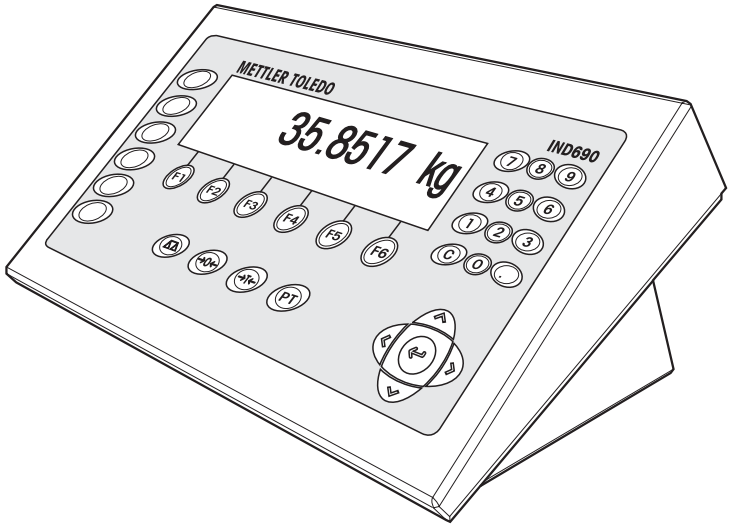
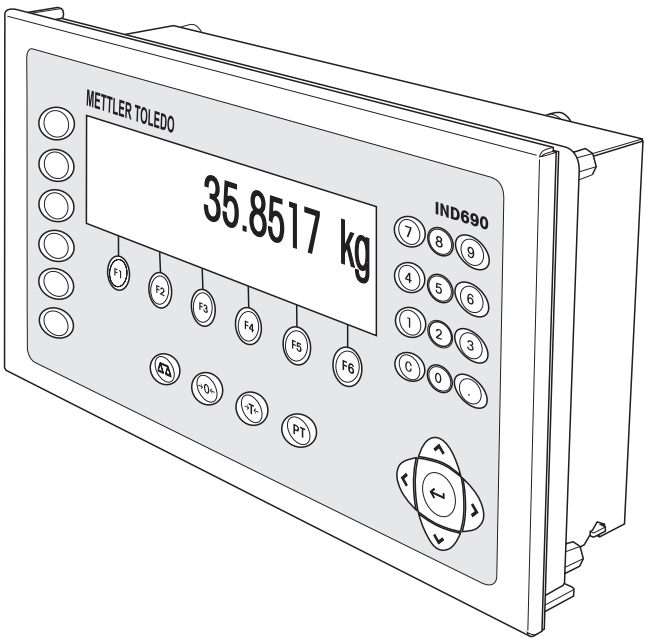
Installation information

METTLER TOLEDO MultiRange

Weighing terminals IND690 / IND690xx / IND690-24V





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ServiceXXL
Tailored Services

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a ServiceXXL agreement tailored to your needs and budget.

We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.

Contents

		Page
1	**Safety instructions**	**4**
1.1	Safety instructions for IND690xx	4
1.2	Safety instructions for IND690-24V	6
1.3	Safety instructions for IND690	7
2	**Introduction**	**8**
2.1	Documentation	8
2.2	Housing variants	8
2.3	Software application	8
2.4	Possible applications	9
2.5	Connections	10
2.6	Interfaces	10
3	**Commissioning**	**14**
3.1	Mounting the panel unit	14
3.2	Mounting the desk unit	15
3.3	Connecting the weighing platform	27
3.4	Configuring COM1	30
3.5	Connecting the ProfibusDP-690	30
3.6	Marking and sealing on verified weighing platforms	33
3.7	Particular points when commissioning the IND690xx	34
3.8	Mains connection / connecting 24 V power supply	36
4	**Retrofitting**	**38**
4.1	Opening terminal	38
4.2	Mounting push-on modules	39
4.3	Installing AnalogScale-690	42
4.4	Installing Ethernet-690	43
4.5	Installing the ProfibusDP-690	45
4.6	Installing WLAN-690	46
4.7	Installing Bluetooth-690	49
4.8	Installing AlibiMemory-690	50
4.9	Closing terminal	51
5	**Technical data**	**52**
5.1	Technical data of terminal	52
5.2	Dimensional drawings	56
5.3	Technical data for interfaces	57
6	**Accessories**	**66**

1 Safety instructions

1.1 Safety instructions for IND690xx

The explosion-protected IND690xx weighing terminal fulfills Device category 3 and is approved for operation in Zone 2 (gases) and Zone 22 (dusts) hazardous areas.
There is an increased risk of injury and damage when the IND690xx weighing terminal is used in a potentially explosive atmosphere.
Special care must be taken when working in such hazardous areas. The code of practice is oriented to the "Safe Distribution" concept drawn up by METTLER TOLEDO.

Competence

- ▲ The IND690xx weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.
- ▲ The mains connection may only be connected or disconnected by the owner's electrician.

Ex approval

- ▲ For the exact specification please refer to the statement of conformity.
- ▲ No modifications may be made to the terminal and no repair work may be performed on the modules. Any weighing platform or system modules that are used must comply with the specifications contained in the installation instructions. Non-compliant equipment jeopardizes the safety of the system, cancels the Ex approval and renders any warranty or product liability claims null and void.
- ▲ The cable glands must be tightened so that a strain relief of ≥ 20 N per mm cable diameter is ensured.
- ▲ When connecting external devices, always observe the maximum permissible connected loads, see Page 12. It must be ensured that no voltages are fed into the IND690xx than it itself provides. The interface parameters have to fulfill the standard.
- ▲ Peripheral devices without an Ex approval may only be operating in non-hazardous areas. It must be ensured that no voltages are fed into the IND690xx than it itself provides. In addition the maximum permissible connected loads have to be observed, see Page 12. The interface parameters have to fulfill the standard.
- ▲ The safety of a weighing system including the IND690xxx weighing terminal is only guaranteed when the weighing system is operated, installed and maintained in accordance with the respective instructions.
- ▲ Also comply with the following:
  - the instructions for the system modules
  - the regulations and standards in the respective country
  - the statutory requirement for electrical equipment installed in hazardous areas in the respective country
  - all instructions related to safety issued by the owner
- ▲ Before initial start-up and following service work, check the explosion-protected weighing system for the proper condition of all safety-related parts.

Installation and retrofitting

- ▲ Only install or perform maintenance work on the weighing terminal, accompanying weighing platforms and accessories in the hazardous zone if the following conditions are fulfilled:
  - the owner has issued a permit ("spark permit" or "fire permit"),
  - the area has been rendered safe and the owner's safety co-ordinator has confirmed that there is no danger,
  - the necessary tools and any required protective clothing are provided (danger of the build-up of static electricity).
- ▲ The certification papers (certificates, manufacturer's declarations) must be present.
- ▲ Connection values of externally connectable devices and cables of other manufacturers must be known, e.g. capacitances, inductances and current consumption.
- ▲ Lay cables in such a way that they are protected from damage.
- ▲ Only route cables into the housing of the system modules via the earthing cable gland or METTLER TOLEDO plug and ensure proper seating of the seals. Ensure that the cable shields are connected correctly and that they have a secure connection to the housing.
- ▲ If the weighing terminal is used in conjunction with an automatic or manual filling plant, all of the system modules must be equipped with a permanently wired emergency stop circuit, independent of the system circuit, in order to prevent personal injury or damage to other items of equipment.
- ▲ The IND690xx panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. For Ex devices at least IP54 is required.
- ▲ Establish an equipotential bonding.
- ▲ If restricted breathing weighing cells are used, test restricted breathing.
- ▲ If the weighing platforms are installed in a pit, test whether primary explosion protection is required.
- ▲ Do not connect or disconnect plugs until the IND690xx has been de-energized for at least 5 minutes.
- ▲ Cover unused connection sockets with protective caps.
- ▲ Mount the labelling for operation in hazardous areas, see Section 3.7.4.
- ▲ After connectors have been mounted, screw on the securing clamps for external connectors.

Operation

▲ Prevent the build-up of static electricity. Therefore:
- always wear suitable working clothes when operating or performing service work on the system,
- do not rub or wipe off the keyboard surface with a dry cloth or glove.

▲ Do not use protective hoods.

▲ Prevent damage to the weighing terminal. Hairline cracks in the keyboard membrane are also considered damage.

▲ If the IND690xx weighing terminal, accompanying weighing platforms or accessories are damaged:
- Switch off weighing terminal.
- Separate the weighing terminal from the mains in accordance with the applicable regulations.
- Secure the weighing terminal against accidental start-up.

1.2 Safety instructions for IND690-24V

▲ Never operate the IND690-24V weighing terminal in hazardous areas; there are special scales in our product line for this purpose.

▲ The IND690-24V weighing terminal may only be connected to a power supply (storage battery or mains) having a 24 VDC SELV power circuit in accordance with EN 60950.

▲ Short-circuit danger!
Ensure that the power supply is connected properly:
brown lead +24 V
blue lead 0 V or negative pole

▲ The safety of the unit is endangered if it is not operated in accordance with these operating instructions.

▲ Only authorized personnel may open the IND690-24V weighing terminal.

Competence

▲ The IND690-24V weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.

1.3 Safety instructions for IND690

- ▲ Do not operate the IND690 weighing terminal in hazardous areas. We have special suitable scales in our range of products for hazardous areas.
- ▲ Ensure that the power socket outlet for the IND690 weighing terminal is earthed and easily accessible, so that it can be de-energized rapidly in emergencies.
- ▲ Ensure that the supply voltage at the installation site lies within in the range of 100 V to 240 V.
- ▲ The safety of the device cannot be ensured if it is not operated in accordance with these operating instructions.
- ▲ Only authorized personnel may open the IND690 weighing terminal.

Competence

- ▲ The IND690 weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.

Leakages

- ▲ The IND690 panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. The respective national standards furthermore have to be observed.

IND690 in the food area

- ▲ In order to avoid condensation leave the device switched on when it is operated in humid areas or is subjected to high temperature fluctuations.

2 Introduction

2.1 Documentation

The weighing terminal comes supplied with a CD containing all the documentation on the IND690 weighing system.
These installation instructions describe the installation of the panel unit, the connection of interfaces in the inside of the device as well as the mounting of additional interfaces.
Basic information on working with the weighing terminal and on the interface settings can be found in the operating instructions IND690-Base.

2.2 Housing variants

IND690 The IND690 weighing terminal is available as a desk unit and as a panel unit for installation in a control cabinet.

IND690-24V The IND690-24V weighing terminal with a 24 VDC power supply is available as a desk unit and as a panel unit for installation in a control cabinet.

IND690xx The IND690xx weighing terminal fulfills Device category 3 and is approved for operation in Zone 2 (gases) and Zone 22 (dusts) hazardous areas. The IND690xx is also available as a desk unit or as a panel unit.
For the exact specification of the Ex approval please refer to the statement of conformity.

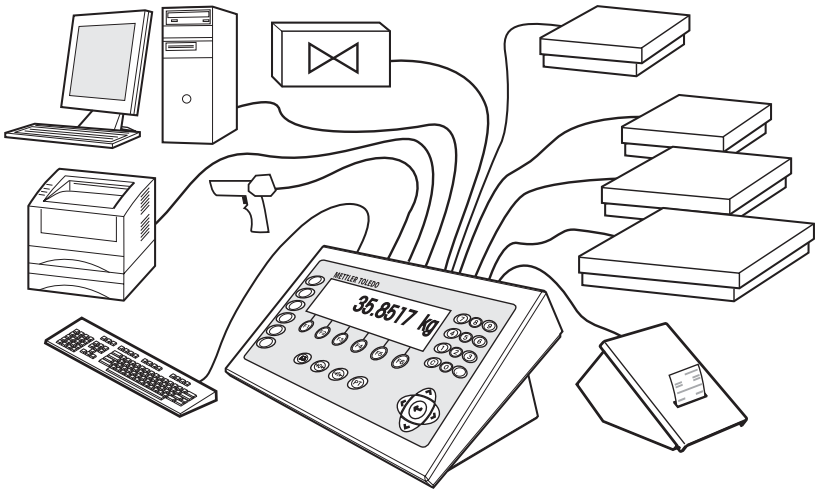
2.3 Software application

The following application software that is loaded on-board at the factory is available for the weighing terminal:
Batch-690, Com-690, Control-690, Count-690, Fill-690, Form-690, FormXP-690, Sum-690.

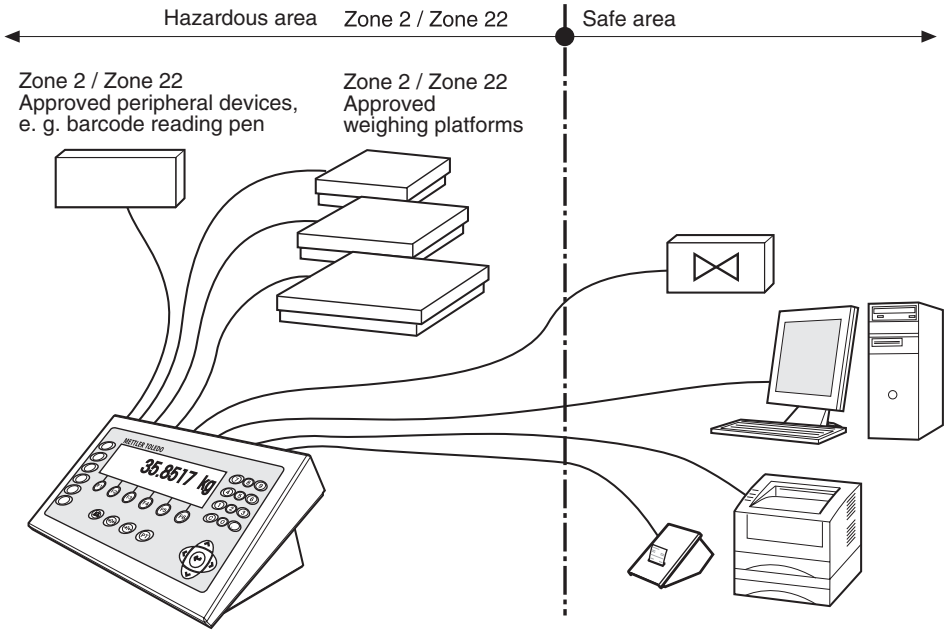
2.4 Possible applications

The weighing terminals can be used for the following applications:

IND690
IND690-24V

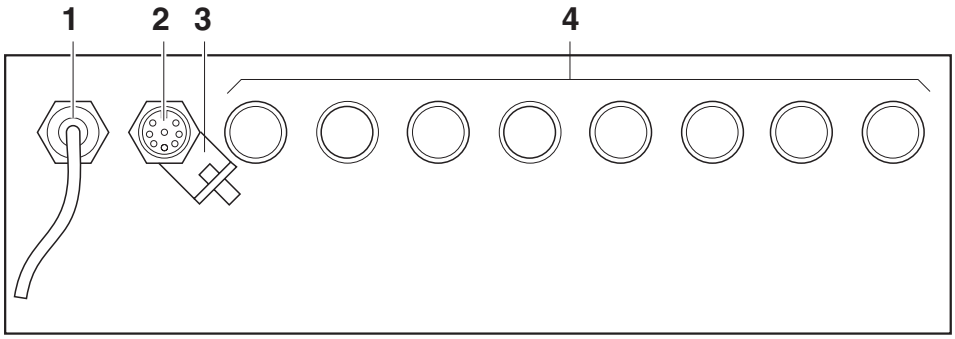


IND690xx



- Multi-scale operation with up to 4 weighing platforms at IND690 and up to 3 weighing platforms at IND690xx and IND690-24V, including weighing platforms with an analog signal output.
- Up to 9 data interfaces
  - for printing
  - for exchanging data with a computer
  - for connecting a barcode reader
  - for controlling e.g. valves or flaps
  - for connecting reference scales
  - for connecting an external keyboard

2.5 Connections



1 Mains connection

2 COM1 – standard RS232 interface

3 Equipotential bonding terminal (only IND690xx)

4 Optional interface connections COM2 ... COM9

2.6 Interfaces

2.6.1 Overview

By default the IND690(xx) has an RS232 interface (COM1). A maximum total of 8 further interfaces can be installed (COM2 ... COM9).
The following further interfaces are available:

	Designation	**Note**	**Design**
Scales interfaces	IDNet-690	For connecting IDNet weighing platforms	Push-on modules
	SICS-Scale-690	For connecting SICS weighing platforms	
	AnalogScale-690	For connecting analog weighing platforms	Interface card
Serial interfaces	CL20mA-690	–	Push-on modules
	RS232-690	–	
	RS485/422-690	Can be configured as RS485 or RS422	
	USB-690	–	
Network and field bus connections	Ethernet-690	–	Network cards
	ProfibusDP-690	–	
	WLAN-690	–	
Further interfaces	Bluetooth-690	–	Push-on modules
	4I/O-690	Digital inputs/outputs	
	AnalogOut-690	Digital-analog output	
	PS2-690	For connecting an external keyboard	
	AlibiMemory-690	Alibi memory	Internal card

2.6.2 Combination possibilities

The interfaces can be combined as follows:

	COM1	COM2	COM3	COM4	COM5	COM6	COM7	COM8	COM9	IND690	IND690xx	IND690-24V
RS232-690	x	x	x	x	x	x	x	x	x	max. 9	max. 9	max. 9
IDNet-690	–	x	x	x	x	–	–	–	–	max. 4	max. 3	max. 3
SICS-Scale-690	–	x	x	x	x	–	–	–	–	max. 4	max. 3	max. 3
AnalogScale-690	–	x	x	x	x	–	–	–	–	max. 4	max. 3	max. 3
CL20mA-690	–	x	x	x	x	x	x	x	x	max. 8	max. 8	max. 8
RS485/422-690	–	x	x	x	x	x	x	x	x	max. 8	max. 8	max. 8
USB-690	–	x	x	x	x	x	x	x	x	max. 1	max. 1	max. 1
Ethernet-690	–	x	x	x	x	x	x	x	x	max. 1	max. 1	max. 1
ProfibusDP-690	–	x	x	x	x	x	x	x	x	max. 1	max. 1	max. 1
WLAN-690	–	x	x	x	x	x	x	x	x	max. 1	max. 1	max. 1
Bluetooth-690	–	x	x	x	x	x	x	x	x	max. 4	max. 2	max. 2
4I/O-690	–	–	–	–	x	x	–	–	–	max. 2	max. 2	max. 2
AnalogOut-690	–	–	–	–	x	x	–	–	–	max. 2	max. 2	max. 2
PS2-690	–	–	–	–	–	–	–	–	x	max. 1	max. 1	max. 1
AlibiMemory-690	–	x	x	x	x	x	x	x	x	max. 1	max. 1	max. 1

Limitations The following limitations have to be observed:

- At the IND690 a maximum of 4 interface cards[1)] and 2 networks cards[2)] can be mounted.

  At the IND690xx and IND690-24V a maximum of 3 weighing interfaces[3)], 1 AlibiMemory and 2 network cards[2)] can be mounted. If Bluetooth is mounted, only 1 network card[2)] can be mounted.
- WLAN-690 and AlibiMemory-690 may not be installed at the same time at the IND690xx.
- Scale interfaces[3)] have to be installed without gaps beginning with COM2.
- It must be ensured that no voltages are fed into the terminal than it itself provides. The interface parameters have to fulfill the standard.

[1)] AnalogScale-690 and AlibiMemory-690

[2)] Ethernet-690, WLAN-690, ProfibusDP-690

[3)] IDNet-690, SICS-Scale-690, Analog Scale-690

- The following total load of the output voltages is to be observed when several peripheral devices are connected:

	IND690	**IND690xx / IND690-24V**
Output voltage 5 V	max. 600 mA	max. 100 mA to max. 300 mA, depending on the design level *
Output voltage 12 V	max. 200 mA	max. 200 mA
Output voltage 24 V	max. 100 mA	max. 100 mA

* At the IND690xx and IND690-24V the maximum total load of the 5 V output voltage depends on the combination of the installed interface modules and network cards. If a combination of the interface modules or the network cards Ethernet-690, WLAN-690, Profibus-DP-690 and Bluetooth-690 is used, the 5 V output voltage may have a maximum load of 100 mA.

EXPLOSION HAZARD

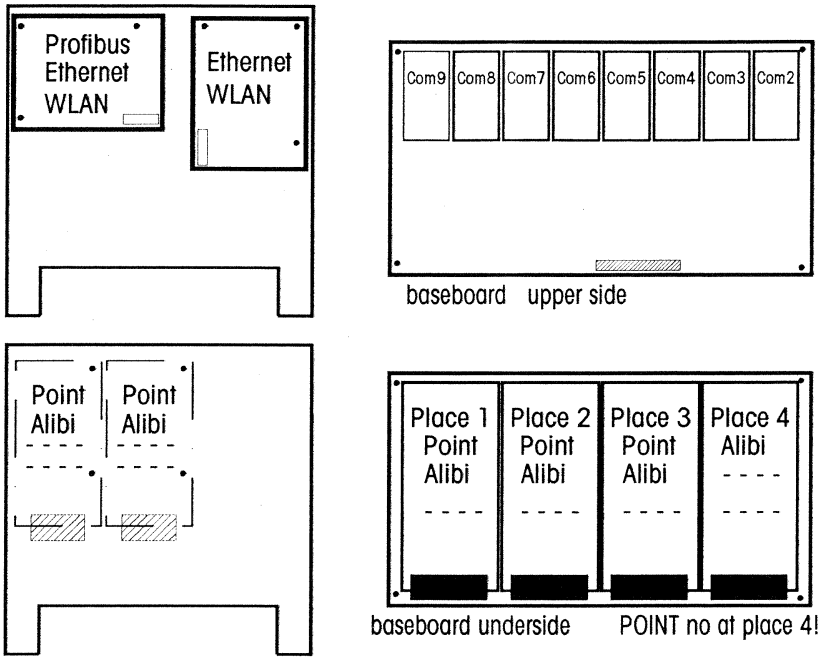
➜ When connecting several external devices to the power-limited 5 V output voltage of the **IND690xx**, observe the following total connection values for the total of all devices including cables:

Total capacity parallel on 5 V C_0 = **max. 200 µF**

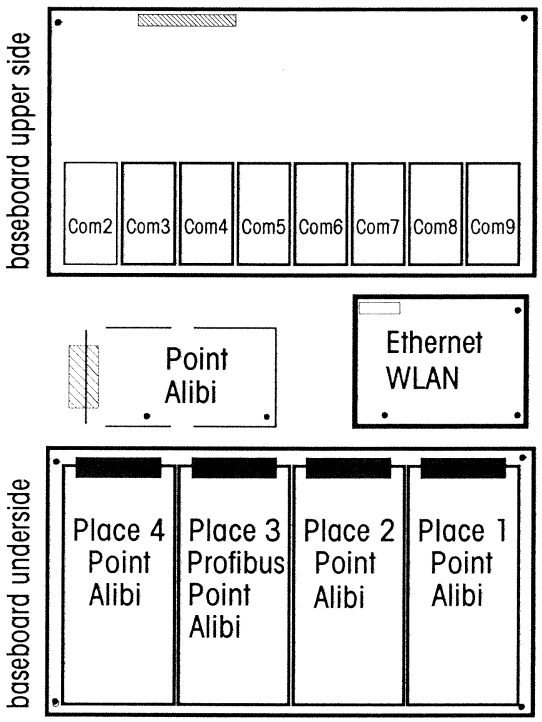
Total inductance in series on 5 V L_0 = **max. 60 µH**

2.6.3 Installation scheme

Desk unit

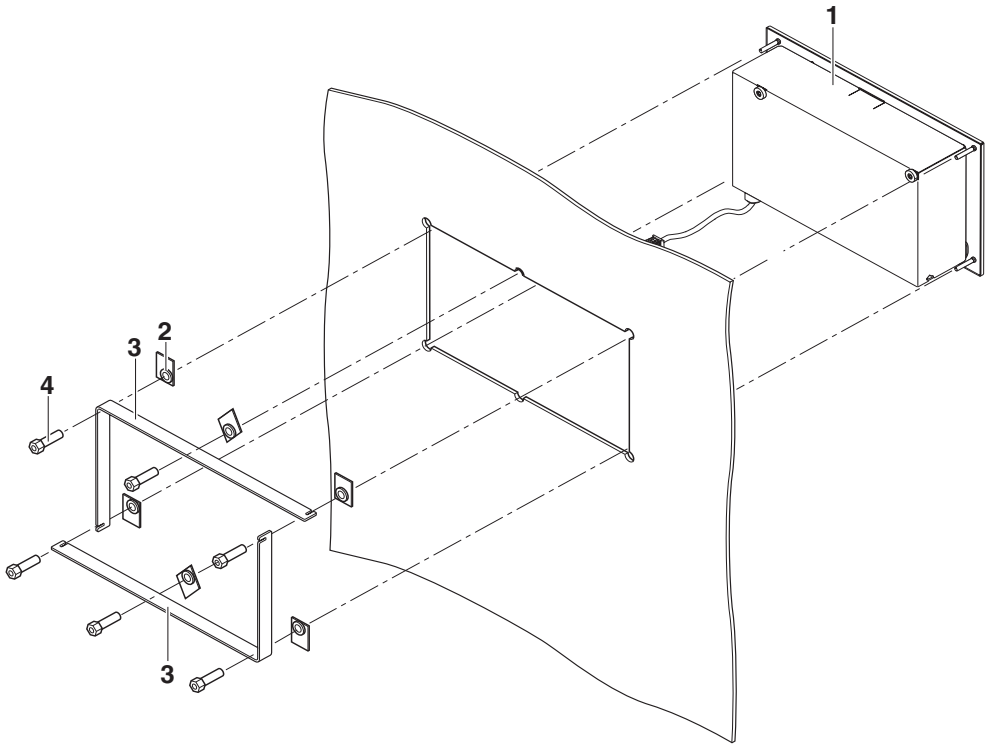


Panel unit



3 Commissioning

3.1 Mounting the panel unit

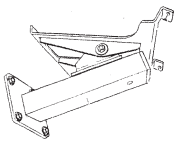
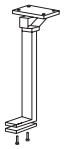
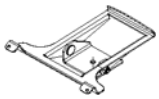
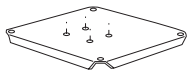
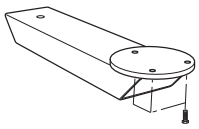


1. Affix the supplied drilling template to the control cabinet and saw out the cut-out for the cover exactly using the sabre saw.
2. Insert the housing (1) from the front into the cut-out.
3. Place on the securing clamps (3) on the rear and fasten them with 6 hexagon nuts (4) and 6 washers (2). Place the washers so that the cover can be removed easily.

3.2 Mounting the desk unit

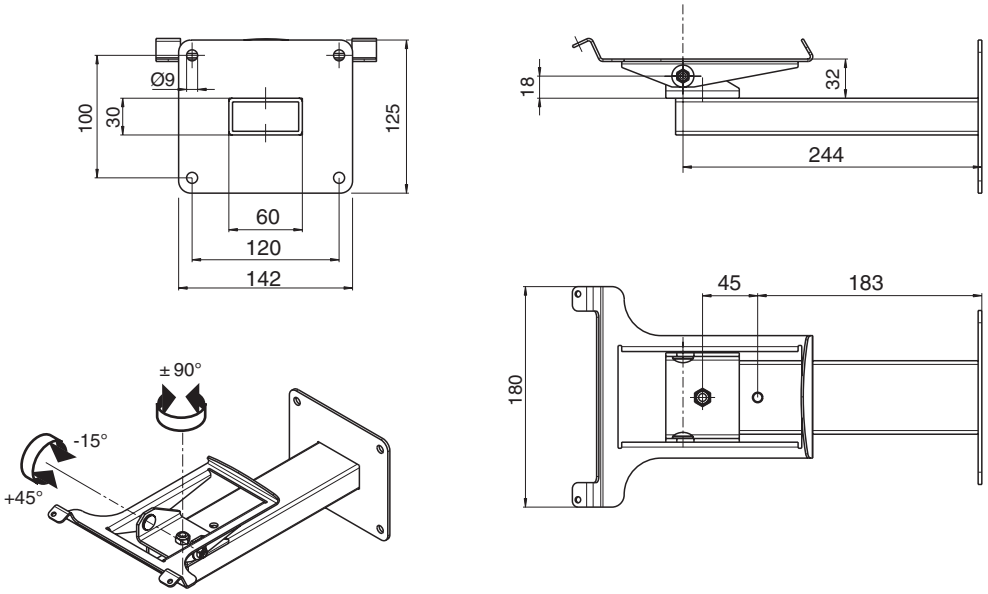
3.2.1 Mounting with brackets and stands

METTLER TOLEDO offers the following options for mounting brackets and stands:

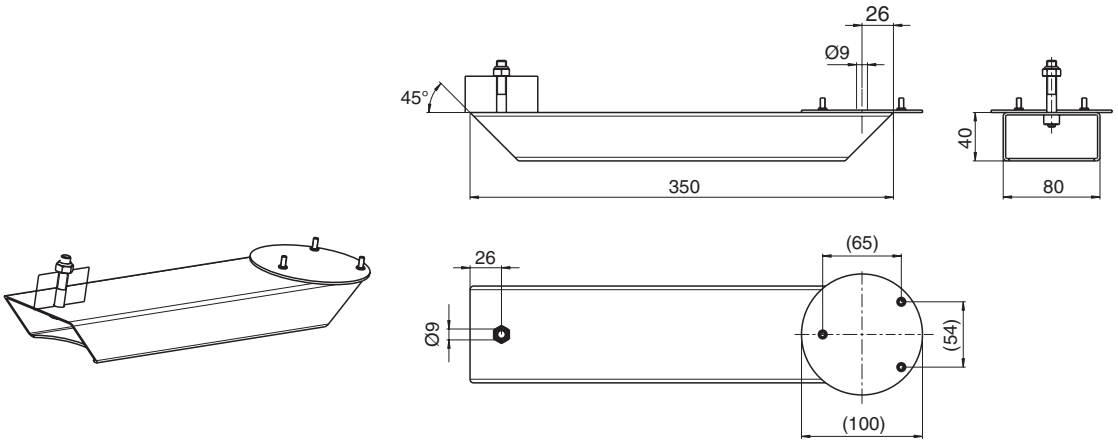
	Description	
	**IND690 wall bracket** For mounting the IND690 weighing terminal on the wall, complete with mounting screws, stainless	22 011 980
	IND690 floor stand For fixed mounting the IND690 weighing terminal to the floor, complete with mounting material, height 1000 mm, stainless	22 011 981
	**IND690 bench stand** For mounting the weighing terminal to the weighing bench for KB, MB, KCC, MCC and PBA430 weighing platforms, height 500 mm, stainless	22 011 986
	**IND690 stand articulated adapter** Retrofit set for old stands, with the exception of scale stand 00 504 439, stainless	22 011 984
	**Stand base** For movable installation of the floor stand, stainless	22 011 982
	**GA46 adapter** For mounting the GA46 printer in combination with the IND690 to the floor stand or to the wall bracket, stainless **May not be mounted to IND690xx!**	22 011 985

3.2.2 Dimensional drawings

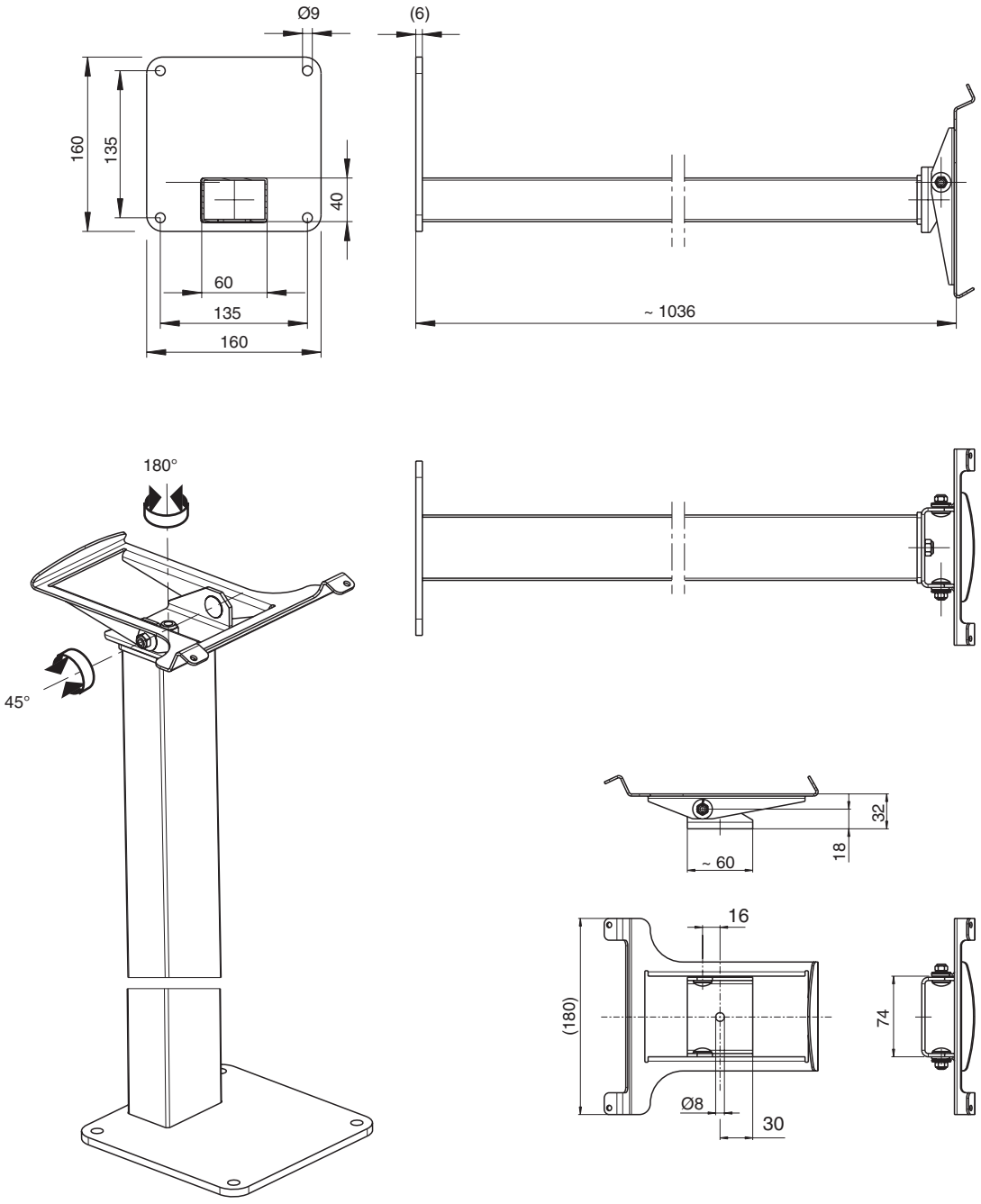
Wall bracket



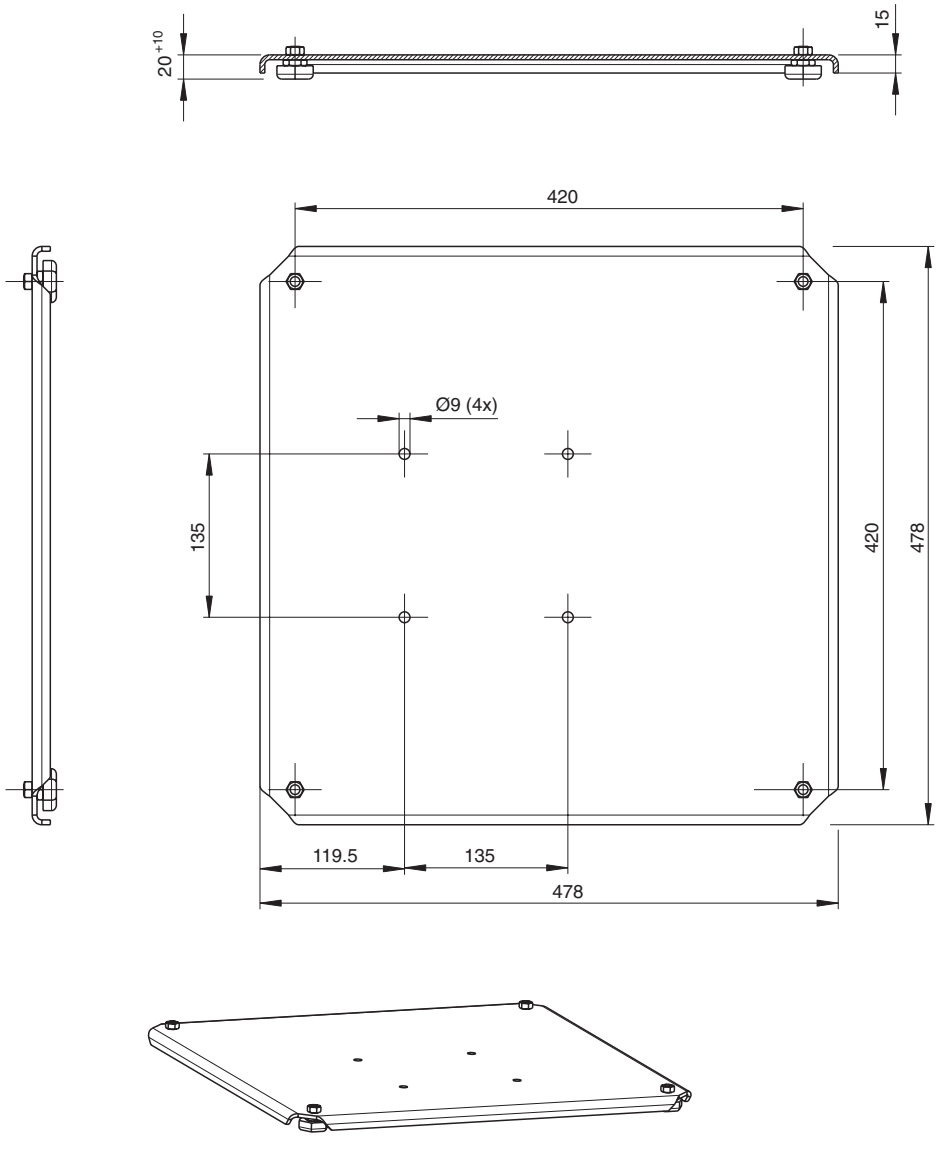
GA46 adapter



Floor stand



Stand base



3.2.3 Safety instructions

- ▲ The supplied mounting material and the instructions are determined for fastening to concrete or stone masonry and stone or concrete floors. Ensure that the dowels are located in fixed masonry or fixed flooring.
- ▲ Before drilling any holes ensure that there are no electrical line or pipes in the wall or in the floor.
- ▲ IND690 and GA46 can only be disconnected from the power supply by pulling the power plug. The socket-outlet has to be freely accessible.
- ▲ The GA46 adapter may not be mounted at the IND690xx, since the GA46 printer and GA46 adapter are not approved for use in a hazardous area.
- ▲ IND690xx does not have a power plug. The power connection has to be connected to a suitable connection socket that is freely accessible. The terminal can only be disconnected from the power supply by means of a suitable external disconnecting device.
- ▲ The distance from the weighing terminal and GA46 to the socket outlet or to the connection socket may not exceed 2.20 m in case of wall mounting. In case of floor mounting the distance from the cable outlet at the floor stand to the socket outlet or connection socket may not exceed 1.20 m.
- ▲ The power cord must be laid directly and freely to the socket outlet. It may not be laid through holes and openings. It may not be laid in cable ducts or fastened to the wall or other objects using cable clamps or other fastening material.
- ▲ In addition observe the respective national standards and safety regulations.
- ▲ During assembly and disassembly various parts of the wall bracket and at the floor stand can be moved. Be careful not to pinch fingers or cables.
- ▲ All the screws have to be tightened.
- ▲ If the stand articulated adapter is screwed tight so that the terminal can be rotated and tilted, it is possible that cables, fingers or other parts can be jammed or pinched.
- ▲ Ensure during assembly and disassembly in particular that the floor stand does not tilt and that the terminal or other parts do not fall down. Risk of injury.
- ▲ Mount the floor stand, also in connection with the stand base vertically. Otherwise there is a danger of tilting. The stand base may not wobble. If necessary, adjust it using the leveling feet.

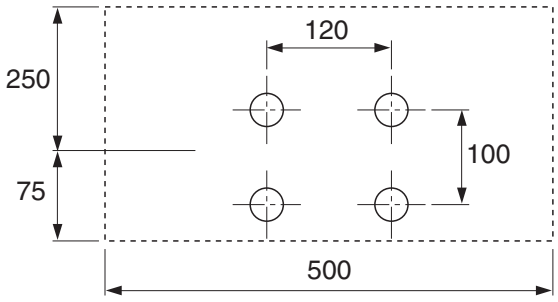
3.2.4 Mounting the desk unit to the wall

Required tools

- Hand drill
- Stone drill bit ∅ 8 mm
- Open end wrench size 10 mm (1)
- Box wrench size 5.5 mm (2)
- 2 x open end wrench size 13 mm (3)

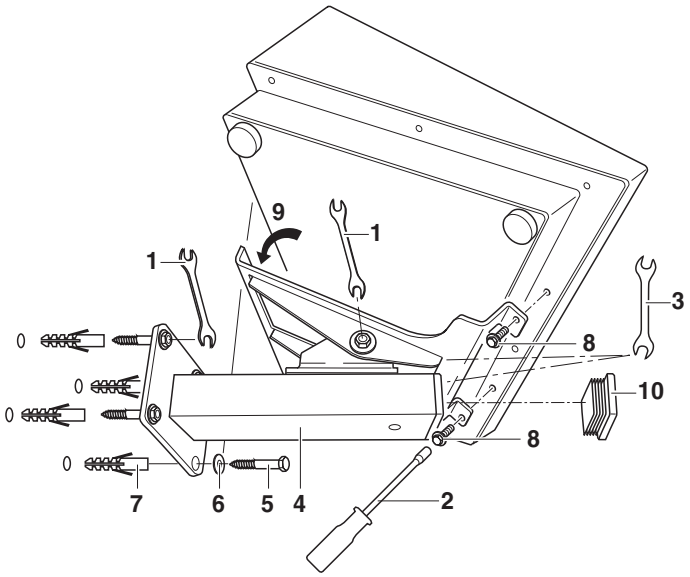
Mounting

Approximate required space



Dimensions in mm

1. Drill holes in the wall in accordance with the drawing (not to scale): 4 holes, ∅ 8 mm, 60 mm deep.



2. Screw the completely premounted wall bracket (4) with the supplied dowels (7), washers (6) and wooden screws (5) to the wall using the open end wrench (1).
3. Turn over the weighing terminal, place it on its front side on a soft surface and loosen the 2 screws (8) on the cover rear using the box wrench (2).
4. Hang the weighing terminal into the stand articulated adapter (9) and position it so that the holes of the stand articulated adapter and weighing terminal match.

5. Use the 2 screws (8) to mount the weighing terminal to the stand articulated adapter using the box wrench (2).
6. Set the angle of inclination of the weighing terminal and fasten the nuts using the open end wrench (1).
7. Turn the weighing terminal to the desired position and tighten the nuts using the open end wrench (3). In the process the screw has to be held with a second open end wrench (3).
8. Close the tube with tube plugs (10).

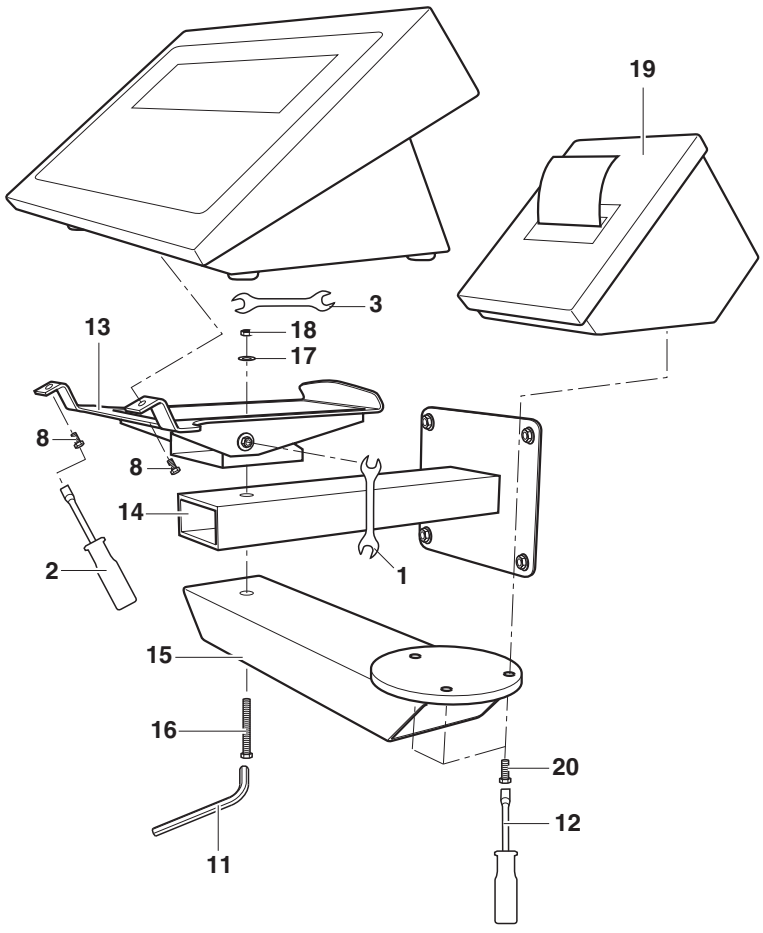
Note
When carrying out repairs and maintenance it is only necessary to loosen the two screws (8) at the stand articulated adapter using the box wrench (2) in order to remove the weighing terminal.

Mounting with GA46 adapter
Mounting with a GA46 adapter differs from the procedure described above in the following points:

Additional tool

- Hexagon socket screw key size 6 mm (11)
- Box wrench Torx T20 (12)

Additional mounting steps



1. Before beginning the mounting work dismantle the stand articulated adapter (13) and wall bracket (14) using the open end wrench (3).
2. Fasten the GA46 adapter (15) with the long screw (16), the spring washer (17) and the nut (18) to the wall bracket and stand articulated adapter using the hexagon socket screw key (11).
3. Before hanging in the terminal, fasten the GA46 printer (19) with 3 screws (20) to the GA46 adapter using the box wrench (12).

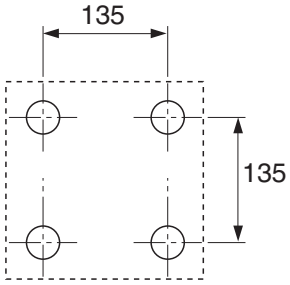
Note
The printer GA46 can be turned as required.

3.2.5 Mounting the desk unit fixed to the floor

Required tools

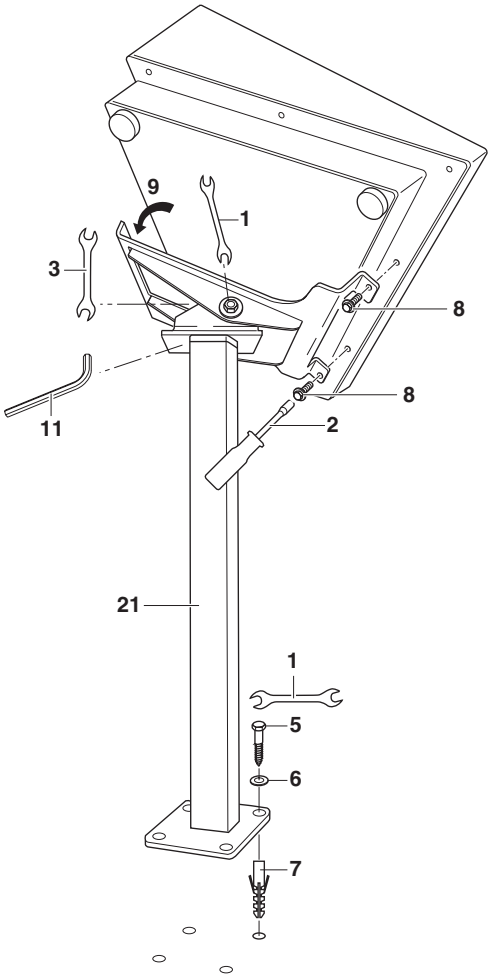
- Hand drill
- Stone drill bit ∅ 8 mm
- Open end wrench size 10 mm (1)
- Box wrench size 5.5 mm (2)
- Open end wrench size 13 mm (3)
- Hexagon socket screw key size 6 mm (11)

Mounting
Approximate required space: 200 x 200 mm



Dimensions in mm

1. Drill holes in the floor in accordance with the drawing (not to scale):
   4 holes, ∅ 8 mm, 60 mm deep.



2. Screw the completely premounted floor stand (21) with the supplied dowels (7), washers (6) and wooden screws (5) at all 4 holes onto the floor using the open end wrench (1).
3. Turn over the weighing terminal, place it on its front side on a soft surface and loosen the 2 screws (8) on the cover rear using the box wrench (2).
4. Hang the weighing terminal into the stand articulated adapter (9) and position it so that the holes of the stand articulated adapter and weighing terminal match.
5. Use the 2 screws (8) to mount the weighing terminal to the stand articulated adapter using the box wrench (2).
6. Set the angle of inclination of the weighing terminal and fasten the nuts using an open end wrench (1).
7. Turn the weighing terminal to the desired position and tighten the nuts using an open end wrench (3). In the process the screw has to be held from below using a hexagon socket screw key (11).
8. If necessary, lay the cable in the stand tube.

Note

When carrying out repairs and maintenance it is only necessary to loosen the two screws (8) at the stand articulated adapter using the box wrench (2) in order to remove the weighing terminal.

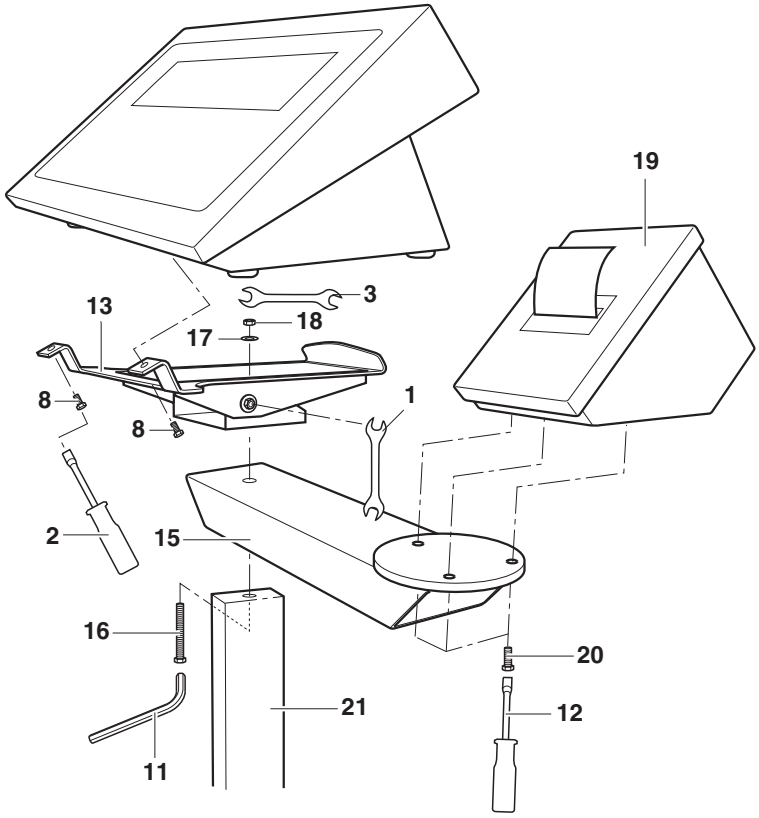
Mounting with GA46 adapter

Mounting with a GA46 adapter differs from the procedure described above in the following points:

Additional tool

- Box wrench Torx T20 (12)

Additional mounting steps



1. Before beginning the mounting work dismantle the stand articulated adapter (13) and floor stand (21).
2. Fasten the GA46 adapter (15) with the long screw (16), the spring washer (17) and the nut (18) between the floor stand and the stand articulated adapter (13).
3. Before hanging in the terminal, fasten the GA46 printer (19) with 3 screws (20) to the GA46 adapter.

Note

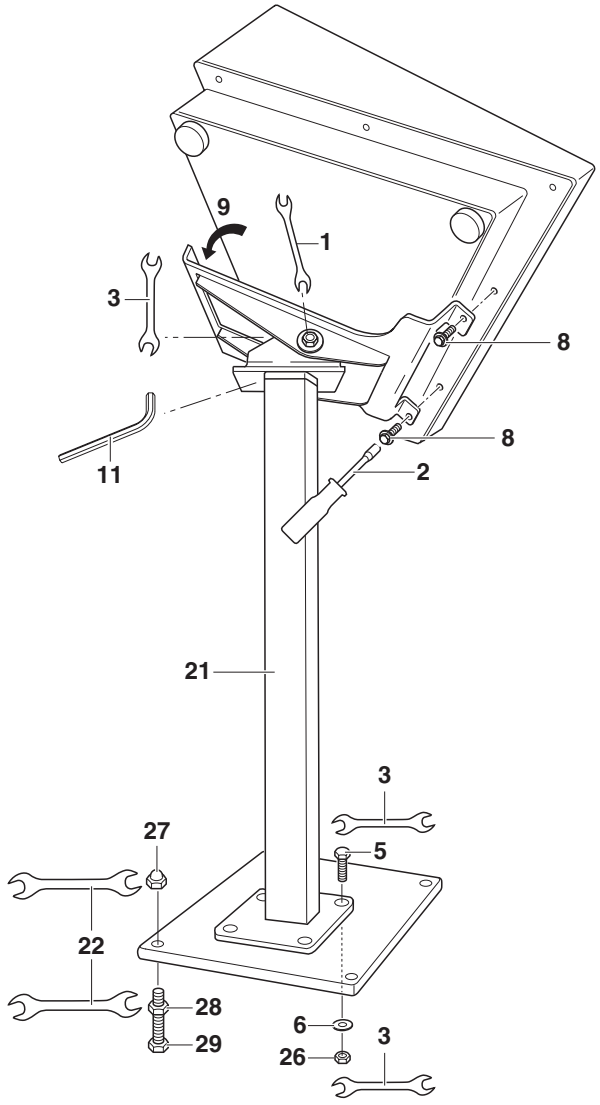
The GA46 printer can be turned as required.

3.2.6 Setting up with floor stand and stand base

Required tools

- Open end wrench size 10 mm (1)
- Box wrench size 5.5 mm (2)
- 2 x open end wrench size 13 mm (3)
- Hexagon socket screw key size 6 mm (11)
- 2 x open end wrench size 17 mm (22)

Mounting



1. Screw the completely premounted floor stand (12) with the supplied hexagon nuts (26), washers (6) and screws (5) at all 4 holes to the stand base using two open end wrenches (3).
2. Turn over the weighing terminal, place it on its front side on a soft surface and loosen the 2 screws (8) on the cover rear using the box wrench (2).

3. Hang the weighing terminal into the stand articulated adapter (9) and position it so that the holes of the stand articulated adapter and weighing terminal match.
4. Use the 2 screws (8) to mount the weighing terminal to the stand articulated adapter using the box wrench (2).
5. Set the angle of inclination of the weighing terminal and fasten the nuts using the open end wrench (1).
6. Turn the weighing terminal to the desired position and tighten the nuts using the open end wrench (3). In the process the screw has to be held from below using a hexagon socket screw key (11).
7. If necessary, lay the cable in the stand tube.
8. If the stand base wobbles, adjust the height using the leveling feet (29) in the corners of the base.
   – To do so, loosen the hexagon cap nut (27) using the open end wrench (22) and adjust the nut (28) on the leveling foot (29) as required.
   – Refasten the leveling foot (29) with set nut (28) by hand with the hexagon cap nut (27) in the stand base.
   – Hold the nut (28) with the open end wrench (22) and tighten the hexagon cap nut (27) using a second open end wrench (27).

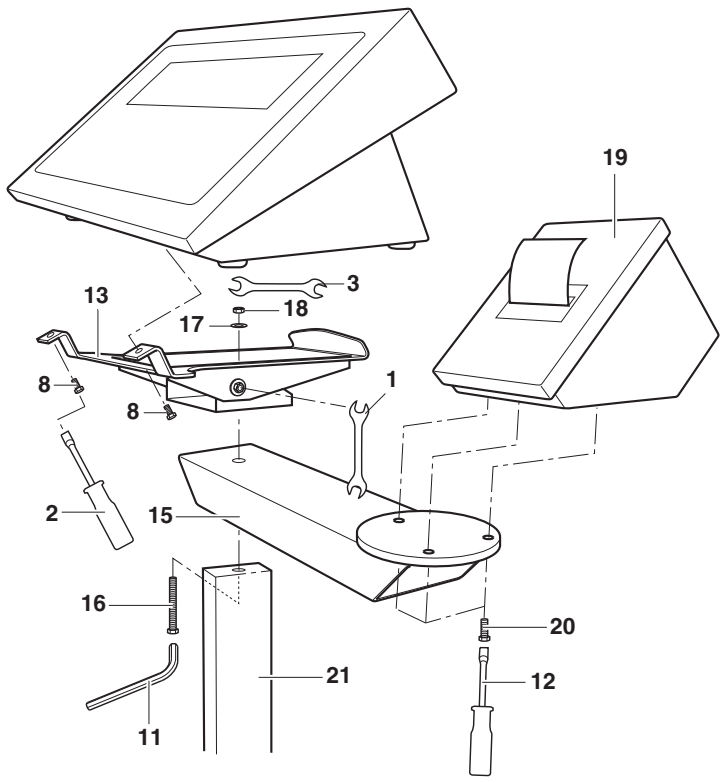
Mounting with GA46 adapter

Mounting with a GA46 adapter differs from the procedure described above in the following points:

Additional tool

- Box wrench Torx T20 (12)

Additional mounting steps



1. Before beginning the mounting work dismantle the stand articulated adapter (13) and floor stand (21).
2. Fasten the GA46 adapter (15) with the long screw (16), the spring washer (17) and the nut (18) between the floor stand (21) and the stand articulated adapter (13).
3. Before hanging in the terminal, fasten the GA46 printer (19) with 3 screws (20) to the GA46 adapter.

Note
The GA46 printer can be turned as required.

3.3 Connecting the weighing platform

Condition
A corresponding scales interface is installed.
If this is not yet the case, see Section 4.2 (IDNet, SICS) or Section 4.3 (Analog Scale).

3.3.1 Connecting weighing platforms with an IDNet or SICS connection

1. Set up the weighing platform, see the installation instructions of the weighing platform.
2. Lay the weighing platform cable to the weighing terminal.
3. Connect the weighing platform connector to the weighing terminal.

3.3.2 Connecting analog weighing platforms

CE conformity

With longer connection cables, shielding measures against radiation and irradiation of interference are particularly important.
The required interference immunity classes will only be achieved with careful installation and wiring of all connected peripherals, weighing platforms and weighing cells. For this purpose the shielding must be connected properly on both ends.
The CE conformity of the entire system is the responsibility of the person commissioning the device.

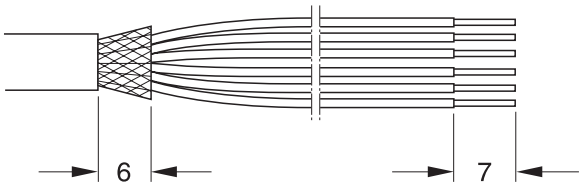
Verified weighing platforms

Verified weighing platforms require the ID card which has to be mounted via the weighing terminal cable before connection to the weighing terminal. In addition the analog PCB has to be sealed.
Please contact the METTLER TOLEDO Service for labelling and verification of your weighing system.

Preparatory work

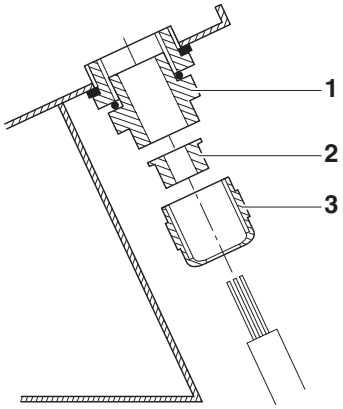
1. Set up the weighing platform, see the installation instructions of the weighing platform.
2. Lay the weighing platform cable to the weighing terminal.
3. Open terminal, see Section 4.1.
4. Remove the heavy-gauge screw joint for the weighing terminal connection.
5. Pull the test cable off the AnalogScale-690 PCB.

Preparing the weighing platform cable



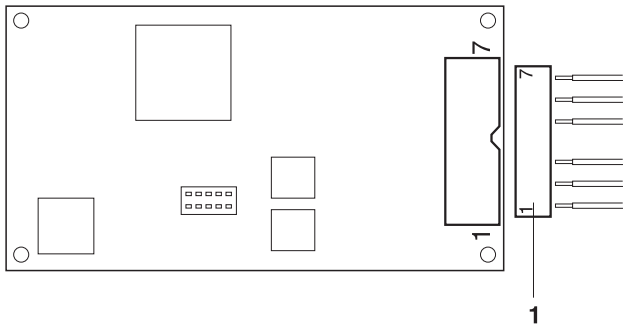
1. Strip the cable ends with a sufficient length and shorten the cable shield to 6 mm.
2. Strip the core ends approx. 7 mm and twist them.
3. Push on the wire end ferrules and press them on firmly with a pair of crimping pliers. The cable ends may not project over the wire end ferrules.

Connecting the cable gland to the weighing platform cable



1. Slide the union nut (3) and moulded seal (2) over the cable sheathing. If any braided screen cores loosen in the process, these may not contact any conductive system parts!
2. Unbraid the exposed screen.
3. Slide the moulded seal (2) forwards to the edge of the cable sheathing and apply the screen.
4. Insert the moulded seal with the cable into the anti-twist guard of the metal housing (1).
5. Screw the union nut onto the metal housing, but do not tighten it.

Connecting the cable



Pin	Assignment
1	+ EXC
2	+ SEN
3	+ SIG
4	–
5	– SIG
6	– SEN
7	– EXC

1. Pull the connector (1) from the analog PCB and terminate the cores of the weighing platform cable at the connector as shown above. For information on the colour coding please refer to the weighing platform documentation.

Note

➜ If the cable of the weighing platform to be connected has only 4 cores, connect the following terminal pairs by means of a wire jumper.

- Terminal 1 and 2 (+ EXC and + SEN)
- Terminal 6 and 7 (– SEN and – ECX)

2. Connect the connector at the analog PCB and tighten the heavy-gauge screw joint.
3. Close the weighing terminal, see Section 4.9.

3.3.3 Connecting LabTec X/XP/XS scales

Condition

- Interface SICS-Scale-690 installed on COM2 to COM5
- Switch the voltage supply from 5 V to 12 V via pin, see Section 3.4 (COM1) or 4.2.2 (COM2 … COM5)

➜ Use the cable 22015128 to connect the LabTec X/XP/XS scale and weighing terminal IND690.

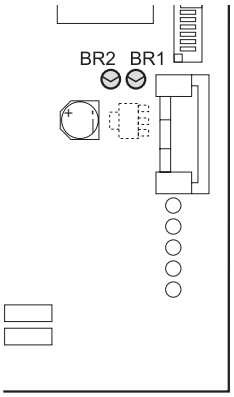
3.3.4 Commissioning several weighing platforms

Scales interfaces have to be installed without gaps beginning with COM2.
IND690(xx) recognizes the connected weighing platforms automatically and, in the case of brand new scales, assigns the scales number as follows:

COM2	Scale 1
COM3	Scale 2
COM4	Scale 3
COM5	Scale 4

If used weighing platforms are connected, two weighing platforms may have the same scales number. In this case IND690(xx) automatically activates the service mode in order to assign a new scales number. Call the METTLER TOLEDO Customer Service.

3.4 Configuring COM1



Pin 5 of the standard RS232-interface COM1 can be configured for connecting devices requiring a supply voltage of 12 V. The maximum current load may not exceed 100 mA.
Default setting at the factory: +5 V

1. Open terminal, see Section 4.1.
2. Configure the soldering jumpers BR1 and BR2 on the main PCB:

Pin 5	**BR1**	**BR2**
+5 V	open	closed
+12 V	closed	open

3.5 Connecting the ProfibusDP-690

EXPLOSION HAZARD
Observe the following points when installing the ProfibusDP-690 field bus card into the IND690xx:

➜ Only use special bus cables with shielding and with a diameter ≥ 7 mm. Recommended wire cross-section ≥ 0.34 mm^2.

➜ Tighten the cable glands so that a strain relief of ≥ 20 N per mm cable cross-section is attained.

CE conformity

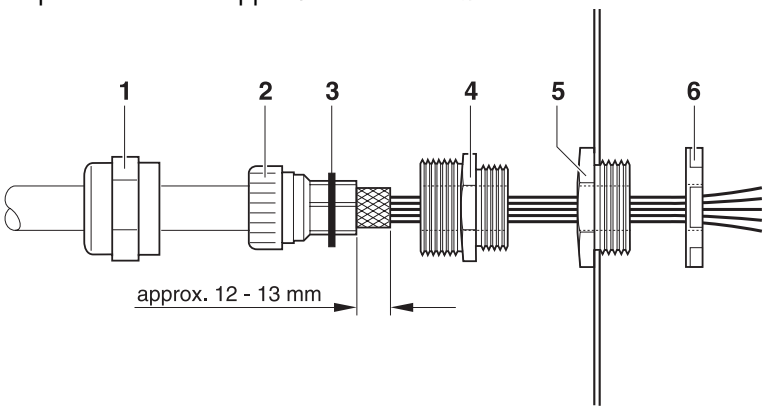
With longer connection cables, shielding measures against radiation and irradiation of interference are particularly important.
The required interference immunity classes will only be achieved with careful installation and wiring of all connected peripherals, weighing platforms and weighing cells. For this purpose the shielding must be connected properly on both ends.
The CE conformity of the entire system is the responsibility of the person commissioning the device.

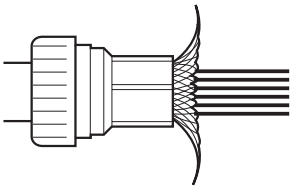
Cable specifications

Only use special bus cables with shielding and with a diameter ≥ 7 mm! Recommended wire cross-section ≥ 0.34 mm^2.

Connecting the bus cable to the cable gland

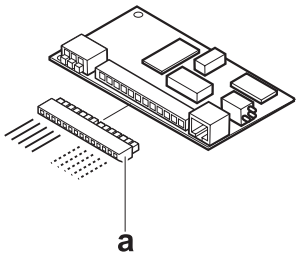
1. Open terminal, see Section 4.1.
2. Strip the cable ends with a sufficient length and shorten the cable shield to approx. 12 – 13 mm.
3. Strip the core ends approx. 7 mm and twist them.





4. Push pressure nut (1) and sealing insert (2) onto cable.
5. Bend over the exposed screen and slide it over the O-ring (3).
6. Push the sealing insert up to the screen.
7. Remove blind plugs from desired interface connection; remove another blind plug for further routing of the Profibus if necessary.
8. Mount the reducing ring (5) with the sealing nut (6) on the housing.
9. Screw the lower section of the heavy-gauge screw joint (4) into the reducing ring.
10. Insert the cable into the housing.
11. Insert the sealing insert into the lower section until it is flush.
12. Screw the pressure nut onto the lower section. The cable gland must be tightened so that a strain relief ≥ 20 N per mm cable diameter is ensured.

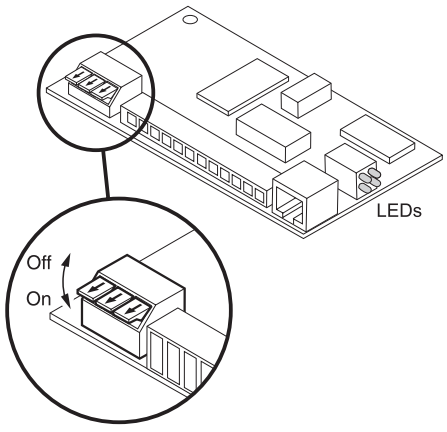
Terminating the bus cable



➜ Pull the Mini-Combicon terminal strip (a) off the Profibus card and connect the bus cable to the terminal strip in accordance with the following table:

Terminal	Assignment	Note
1	Repeater controller RTS	5-V request-to-send (RTS) signal
2	Data Ground	Reference potential for RS485 level
3	Output data signal B	Positive RS485 signal level, to next node, colour red
4	+5 V, insulated	5-V supply, e.g. for fibre-optics adapter
5	Output data signal A	Negative RS485 signal level, to next node, colour green
6	–	–
7	–	–
8	Input data signal B	Positive RS485 signal level, from last node, colour red
9	Repeater controller RTS	5-V request-to-send (RTS) signal
10	+5 V, insulated	5-V supply, e.g. for fibre-optics adapter
11	Data Ground	Reference potential for RS485 level
12	Input data signal A	Negative RS485 signal level, from last node, colour green

Setting matching resistor



➜ If necessary, activate the matching resistor directly on the ProfibusDP-690 interface. To do this, set all dip switches to ON.

Diagnostic LEDs

The 4 diagnostic LEDs on the ProfibusDP-690 interface output the following states:

Yellow LED	Operating voltage switched on
Green LED	Profibus data cycles started
Red LED	Communication dialog faulty
Green LED	Sign of activity in secondary cycle

3.6 Marking and sealing on verified weighing platforms

ID code

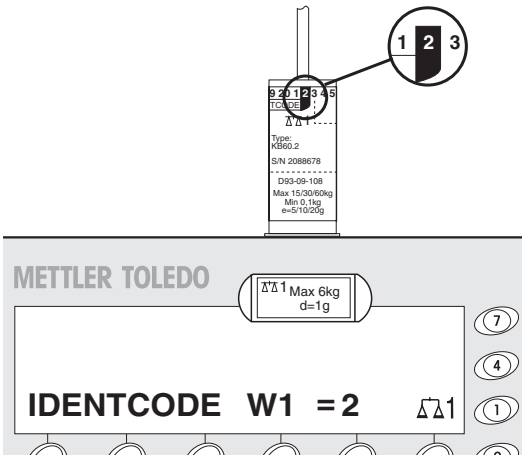
With the ID code you can check on verified weighing platforms whether the weighing platform has been tampered with since the last verification. The ID code can be displayed on the terminal at any time, see the IND690-Base operating instructions.
During verification the currently displayed ID code is saved and sealed.
Each time the configuration is changed, the displayed ID code increases. It then no longer matches the sealed ID code; the verification is no longer valid.

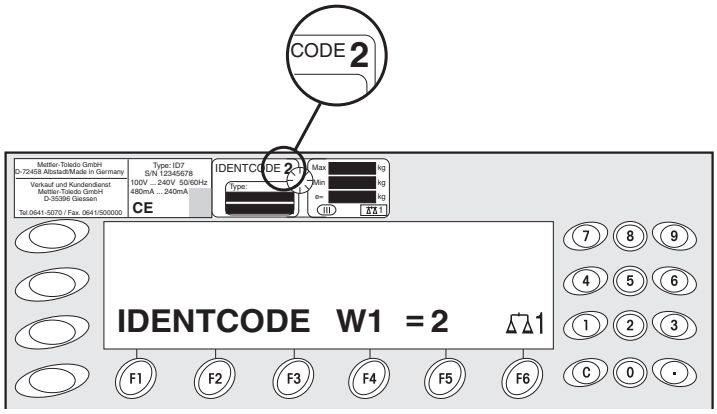
Verification

For marking and verification of your weighing system, please contact METTLER TOLEDO Service or your local Weights and Measurements Office.

Checking the verification

1. Displaying the ID code: to do so keep the →0← key pressed until CODE = ... is displayed.
   On weighing platforms that cannot be verified, no value is displayed, but instead: CODE ===.
2. Compare the ID code with the sealed ID code on the ID card.
   The verification of the weighing system is only valid when both values are identical.





3. Press the →0← key again.
   The connected weighing platform is checked. The display shows CHECKING WEIGHING PLATFORM and then WEIGHING PLATFORM IS OK after the test is completed.
   Then the IND690(xx) returns automatically to normal mode.

3.7 Particular points when commissioning the IND690xx

3.7.1 Equipotential bonding

The equipotential bonding must be installed by a professional electrician when using the IND690xx weighing terminal in hazardous areas.

➜ Connect equipotential bonding of all devices in accordance with the country-specific regulations and standards. In the process, ensure that all device housings are connected to the same potential via the PA terminals.

Equipotential bonding terminal IND690xx

The equipotential bonding terminal of the IND690xx is found on the COM1 socket.

Equipotential bonding terminal weighing platforms

The equipotential bonding terminal and mounting materials are enclosed with the IND690xx weighing terminal.

3.7.2 Testing restricted breathing at weighing platforms with restricted breathing

A restricted breathing test according to the relevant country-specific standards is required in the following cases:

- before first-time commissioning
- at regular intervals thereafter
- after accidental cleaning of the diaphragm with steam jets

A test protocol must be created after each test.

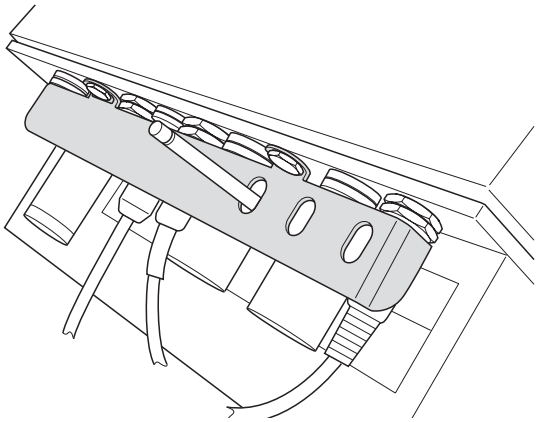
3.7.3 Limited mobility at IND690xx

EXPLOSION HAZARD
The IND690xx weighing terminal, accompanying weighing platforms and accessories may only be operated in Zone 2 and 22 hazardous areas.

Cabling

➜ Protect data and signal cable extensions against inadvertent disconnection by sealing.

➜ Always secure interface connections on the rear using a bracket.



3.7.4 Labelling for operation in hazardous area

The following signs must be mounted on the IND690xx weighing terminal, accompanying weighing platforms and accessories so that they are clearly visible:

- Model plate with the device's model data, manufacturer and serial number
- Safety instructions
- Zone marking
- Temperature range
- For measuring cells with restricted breathing: provide test plate with the date, underline it, and stick it to measuring cell.

3.8 Mains connection / connecting 24 V power supply

3.8.1 Connecting the IND690 to the mains

CAUTION
The IND690 weighing terminal only operates properly with a mains voltage of 100 V to 240 V.

➜ Ensure that the supply voltage at the installation site lies within this range.

➜ Ensure that the mains outlet is earthed and easily accessible.

Connecting

➜ Plug the mains plug into a mains outlet.
In the factory setting the display briefly shows the version of the installed software, the text METTLER TOLEDO IND690 and all the connected scales; then the weight display appears.

3.8.2 Connecting the IND690xx to the mains

EXPLOSION HAZARD

➜ The mains connection may only be connected by the owner's electrician.

CAUTION
The IND690xx weighing terminal only operates properly with a mains voltage of 100 V to 240 V.

➜ Ensure that the supply voltage at the installation site lies within this range.

➜ Ensure that the mains outlet is earthed.

➜ Ensure that equipotential bonding has been implemented.

3.8.3 Connecting the IND690-24V to the power supply

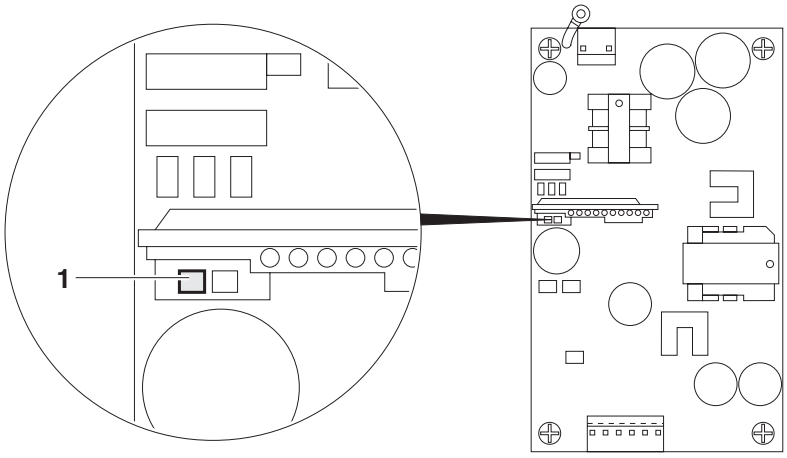
CAUTION
The IND690-24V weighing terminal only functions correctly with a 24 VDC power supply.

➜ Ensure that the IND690-24V is only connected to a power supply (storage battery or mains) having a 24 VDC SELV power circuit in accordance with EN 60950.

Selecting storage battery or mains operation

The IND690-24V weighing terminal is set to storage battery operation at the factory.

1. Open weighing terminal, see Section 4.1.
2. Remove power supply unit cover.



3. Set the switch (1) to the desired position:

   left storage battery operation (default setting)
   right mains operation

4. Replace power supply unit cover and close IND690-24V weighing terminal.

Earthing

The blue lead of the power cable is connected to the GND of the individual voltages and the housing internally.

➜ This is why we recommend the earthing of GND or the negative pole of the supply voltage.

Mains operation

➜ We recommend that the green-yellow lead of the power cable be connected to the earth or the equipotential bonding of the mains or the system.

Storage battery operation

➜ If the negative pole of the storage battery is not earthed, the green-yellow lead of the power cable need not be connected.

➜ If the negative pole of the storage battery is earthed, we recommend that the green-yellow lead of the power cable be connected to the equipotential bonding.

Connecting

➜ Connect the leads of the power cable as follows:
brown lead +24 V
blue lead 0 V or negative pole
Plug mains plug of IND690-24V into a mains outlet.
In the factory setting the display briefly shows METTLER TOLEDO IND690 and the versions of the installed components; then the weight display appears.

4 Retrofitting

4.1 Opening terminal

EXPLOSION HAZARD

➜ Do not open the IND690xx in an explosive dust atmosphere.

➜ On the IND690xx, wait 5 minutes after disconnection from the mains before opening the device or removing the plug.

CAUTION

Before opening the device:

1. Switch off weighing terminal.
2. Disconnect the terminal from the power supply:
   - at the IND690xx deenergize the mains connection or power supply,
   - at the IND690-24V deenergize the power supply or pull the power plug,
   - at the IND690 pull the power plug.

Opening the desk unit

1. Turn the device around carefully and unscrew the 12 screws on the cover underside.
2. Return the device to its normal position and lay the cover down forwards.
3. Disconnect the display and keyboard cables.
4. In order to access the components on the main PCB underside or at the housing base swivel the main PCB upwards.

Opening the panel unit

1. Remove the 2 nuts.
2. Remove the cover.
3. Disconnect the display, keyboard and power cables.
4. In order to access the components on the main PCB underside or at the socket carrier plate swivel the main PCB downwards.

Note

At the IND690xx the interface connectors on the rear are secured with a clamp. If applicable, remove the clamps.

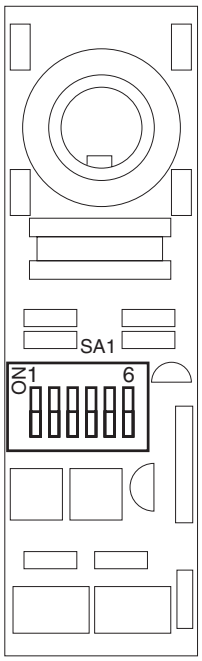
4.2 Mounting push-on modules

Mounting of the following interfaces is identical:

- IDNet-690
- SICS-Scale-690
- CL20mA-690
- RS232-690
- RS485/422-690
- USB-690
- 4I/O-690
- AnalogOut-690
- PS2-690

At the modules CL20mA-690, RS232-690 and RS485/422-690 preparatory work (switch settings, soldering jumpers) may be necessary.

4.2.1 Setting the operating mode at the interface module CL20mA-690



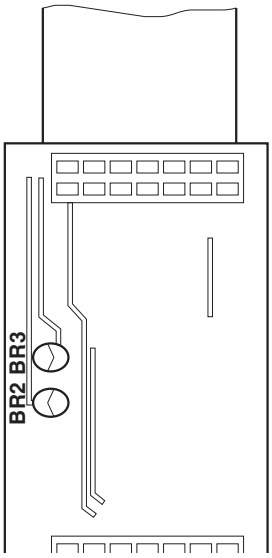
The CL20mA-690 interface module can be operated with either an active or a passive transmission and reception loop.
Factory setting: Passive transmission and reception loop

➜ Set the desired operating mode with the switch SW1 to SW6 on the underside of the CL20mA-690.

	SW2	**SW5**	**SW6**
Transmission loop active	open	closed	closed
Transmission loop passive	closed	open	open

	SW1	**SW3**	**SW4**
Reception loop active	open	closed	closed
Reception loop passive	closed	open	open

4.2.2 Configuring Pin 5 at the interface module RS232-690

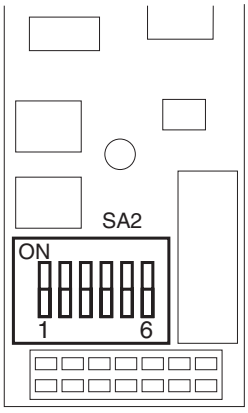


Pin 5 of the RS232-690 interface module can be configured for connecting devices requiring a supply voltage of 12 V. The maximum current load may not exceed 100 mA.
Default setting at the factory: +5 V

➜ Configure the soldering jumpers BR2 and BR3 on the underside of the RS232-690 interface module.

Pin 5	BR2	BR3
+5 V	closed	open
+12 V	open	closed

4.2.3 Configuring the interface type at the interface module RS485/422-690



The operating mode of the RS485/422-690 interface module is determined by the position of the switches SW1 – SW6 on the underside of the interface module.
Default setting at the factory: RS485

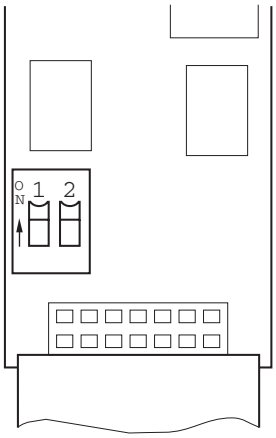
Notes

- When a matching resistor is used the overall load impedance may not drop below 100 Ω.
- At RS485 the resistors activated with SW3 – SW5 ensure that levels defined at the receiver are applied when no station drives the cable.

➜ Set the switches SW1 – SW6 on the interface PCB.

RS422	ON	OFF	RS485	ON	OFF	RS485 / relay box / ARM100	ON	OFF
SW1	x		SW1		x	SW1		x
SW2		x	SW2	x		SW2	x	
SW3		x	SW3	Pull-up resistor for TxD+/ RXD+ active	Pull-up resistor for TxD+/ RXD+ not active	SW3	x	
SW4		x	SW4	Matching resistor 150 Ω active	Matching resistor 150 Ω not active	SW4		x
SW5		x	SW5	Pull-down resistor for TxD–/RXD– active	Pull-down resistor for TxD–/RXD– not active	SW5	x	
SW6	x		SW6		x	SW6		x

4.2.4 Switching power supply at the 4I/O-690 interface module



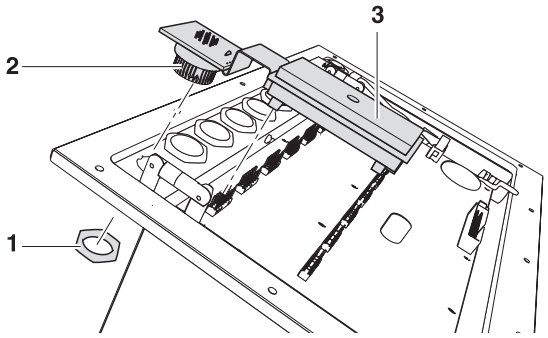
The relay box 4-690 is supplied with power either internally by the weighing terminal or externally.

Factory setting: Internally

➜ Set switches SW1 and SW2 on the interface print.

	SW1	SW2
Internally	ON	ON
Externally	OFF	OFF

4.2.5 Mounting



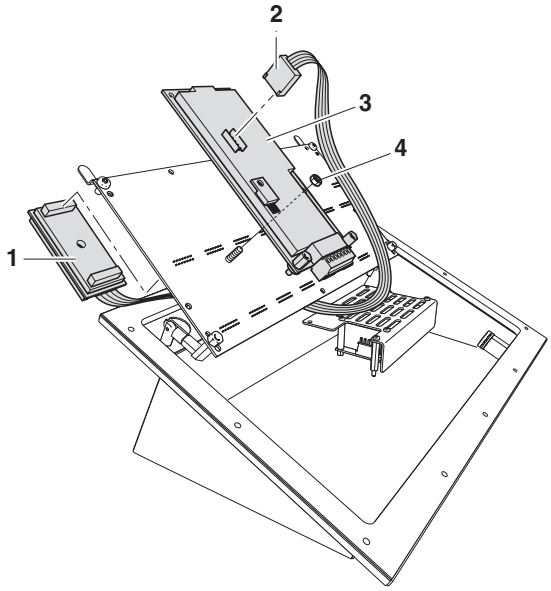
1. Select the interface connection in accordance with the table on Page 11.
2. Remove the blind plug from the desired interface connection.
3. Unscrew the ring nut (1) from the socket PCB.
4. Route the socket (2) from the inside of the housing through the hole to the outside. Ensure proper seating of rubber sealing ring when doing so.
5. Screw on the ring nut from the outside and tighten it.
6. Push the interface module (3) onto the main PCB. When doing so, ensure that the arrow points towards the socket.

4.3 Installing AnalogScale-690

Scope of delivery

- Analog PCB
- PCB adapter for connecting to the main PCB with analog cable for connecting to the analog PCB

Mounting



1. Select the installation position of the analog PCB (Point) in accordance with the installation scheme on Page 13.
   Mounting on the underside of the main PCB (Slot 3) is shown in the graphic.
2. Select the interface connection in accordance with the table on Page 11.
3. Remove the blind plug from the desired interface connection.
4. Mount the analog PCB (3) using the nut (4) on the premounted bolts on the underside of the main PCB.
5. Plug the PCB adapter (1) into a free slot on the top of the main PCB.
6. Lay the analog cable (2) to the underside of the main PCB and connect to the analog PCB.
7. Connect the analog weighing platform, see Section 3.3.2.

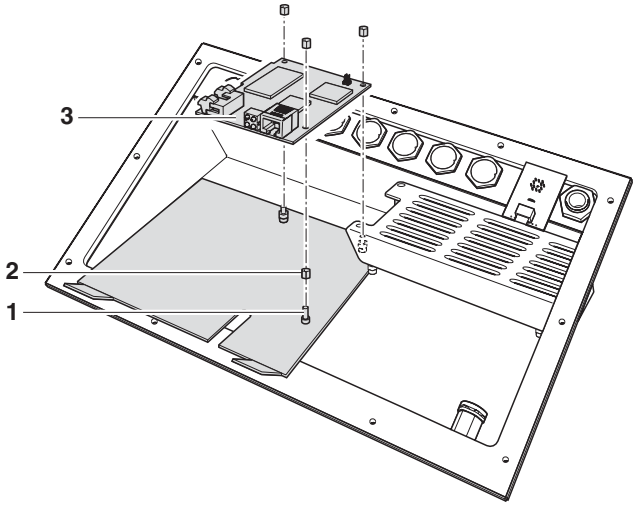
4.4 Installing Ethernet-690

Scope of delivery

- Ethernet card
- Socket adapter: socket PCB with connecting cable for connecting to the RJ45 socket of the Ethernet card, in addition 1 ring nut
- PCB adapter: PCB for connecting to the main PCB with ribbon cable for connecting to the Ethernet card
- Adapter plate for mounting in desk unit

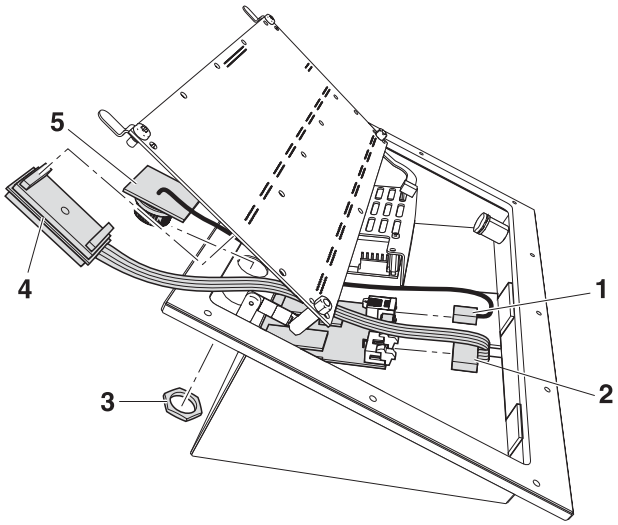
Mounting

Mounting the Ethernet card



1. Select the installation position of the Ethernet card in accordance with the installation scheme on Page 13.
   If within the panel unit the WLAN card is to be mounted at the same position, the Ethernet card has to be mounted on the WLAN card.
   Mounting on the adapter plate (right) is shown in the graphic.
2. Place the spacer sleeves (1) on the respective holes in the adapter sheet and turn in the studs (2).
3. Mount the Ethernet card (3) using 3 nuts on the bolts on the adapter plate at the housing base or onto the socket carrier plate.
4. Insert the adapter plate into the housing until it latches in.

Mounting the Ethernet socket and PCB adapter



1. Select the interface connection in accordance with the table on Page 11.
2. Remove the blind plug from the desired interface connection.
3. Guide socket of socket PCB (5) from inside of housing through hole to outside.
4. Screw on ring nut (3) from outside and tighten. Ensure proper seating of rubber sealing ring when doing so.
5. Ensure that the DIP switches 1 – 4 on the PBC adapter are set for Ethernet.
6. Insert the PCB adapter (4) into a free slot of the main PCB. Ensure proper poling of the PCB: the arrow on the PCB must point toward the sockets.
7. Connect the RJ45 connection (1) of the connecting cable from the socket PCB to the Ethernet card.
8. Lay the ribbon cable of the PCB adapter to the underside of the main PCB and connect the connector (2) of the ribbon cable to the Ethernet card.

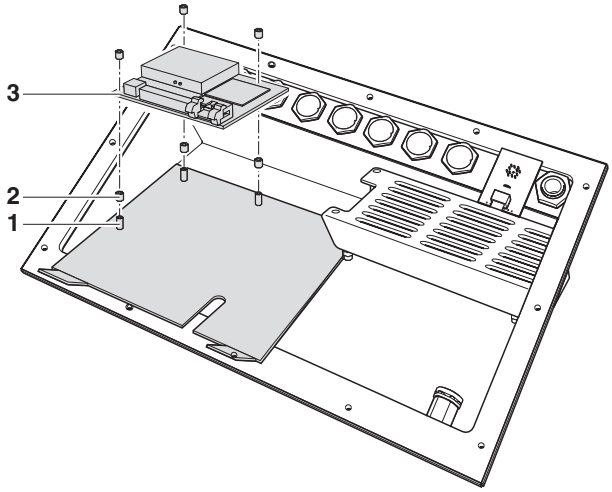
4.5 Installing the ProfibusDP-690

Scope of delivery

- Profibus card with connected Mini-Combicon terminal strip
- PCB adapter: ribbon cable with PCB for connecting to the main PCB
- 2 screw cable fittings (M 16 x 1.5) with blind plugs
- Adapter plate for mounting in desk unit

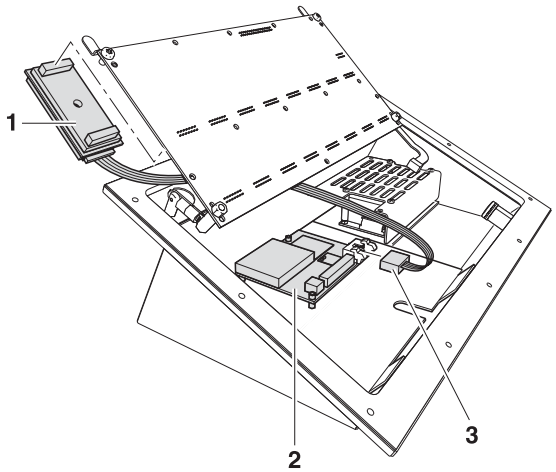
Mounting

Mounting the Profibus card



1. Select the installation position of the Profibus card in accordance with the installation scheme on Page 13.
2. Place the spacer sleeves (1) on the respective holes in the adapter sheet and turn in the studs (2).
3. Mount the Profibus card (3) using 3 nuts on the bolts on the adapter plate at the housing base or onto the socket carrier plate.
4. Insert the adapter plate into the housing until it latches in.

Mounting the Profibus PCB adapter



1. Select 2 interface connections in accordance with the table on Page 11.
2. Remove the blind plugs from the desired interface connections.
3. Ensure that the DIP switches 1 – 4 on the PBC adapter are set for ProfibusDP.
4. Insert the PCB adapter (1) into a free slot of the main PCB. Ensure proper poling of the PCB. the arrow on the PCB must point toward the sockets.
5. Lay the ribbon cable to the underside of the main PCB and connect the connector (3) of the ribbon cable to the socket on the Profibus card (2).
6. Connect the ProfibusDP-690, see Section 3.5.

4.6 Installing WLAN-690

Scope of delivery

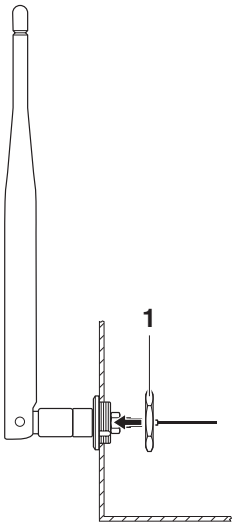
- WLAN card
- PCB adapter: ribbon cable with PCB for connecting to the main PCB
- Antenna with cable
- Ring nut
- Adapter plate for mounting in desk unit

Notes

- For the best possible radio connection, orient the weighing terminal or the antenna in such a way that there is visual contact between the antenna and the WLAN access point.
- Avoid having metal or reinforced concrete walls along the transmission path.
- Check the radio quality before final mounting with the respective display in WLAN master mode, see the IND690-Base operating instructions.
- Provide for an additional external antenna in the case of control cabinet installation.
- It is not possible to give a guarantee for completely faultless WLAN connections due to the non-uniform WLAN specifications in particular at the Access Points.
  If appropriate, the Access Points, their configuration, the transmission path as well as the location of components have to be optimised by IT specialists until no further problems arise.
  If none of these measures produce acceptable results, WLAN can turn out to be an unsuitable transmission medium.

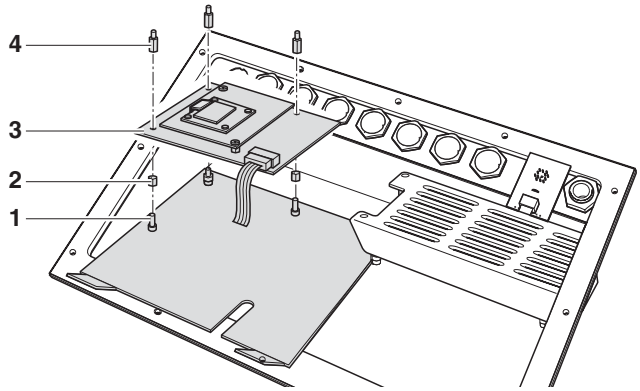
Mounting

Mounting the antenna



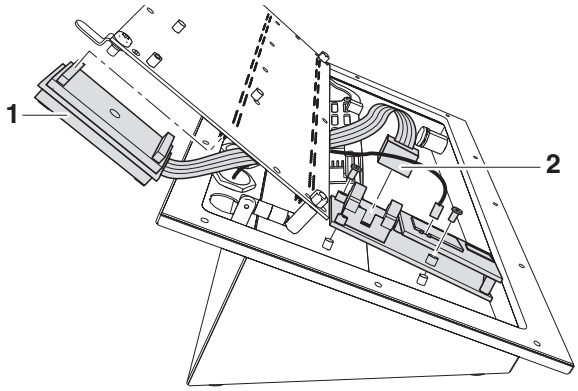
1. Select the interface connection in accordance with the table on Page 11.
2. Remove the blind plug from the desired interface connection.
3. Feed antenna with plug from the outside through the housing hole.
4. Turn the antenna in such a way that it can be erected in the desired direction.
5. Screw on ring nut (1) from inside and tighten.

Mounting the WLAN card



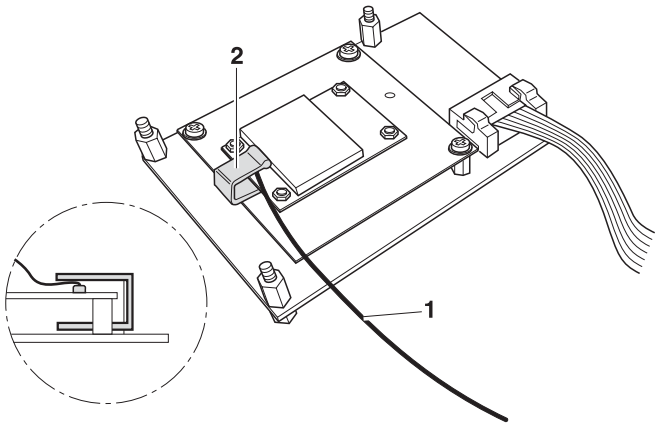
1. Select the installation position of the WLAN card in accordance with the installation scheme on Page 13.
   If within the panel unit the WLAN card is to be mounted at the same position, the WLAN card has to be mounted under the Ethernet card.
   Mounting on the adapter plate (right) is shown in the graphic.
2. Place the spacer sleeves (1) on the respective holes in the adapter sheet and turn in the studs (2).
3. Mount the WLAN card (3) using 3 nuts (4) on the bolts on the adapter plate at the housing base or onto the socket carrier plate.
4. Insert the adapter plate into the housing until it latches in.

Mounting the WLAN PCB adapter



1. Ensure that the DIP switches 1 – 4 on the PBC adapter are set for WLAN.
2. Insert the PCB adapter (1) into a free slot of the main PCB. Ensure proper poling of the PCB: the arrow on the PCB must point toward the sockets.
3. Lay the ribbon cable to the underside of the main PCB and connect the connector (2) of the ribbon cable to the socket on the WLAN card.

Connecting the antenna cable to the WLAN card



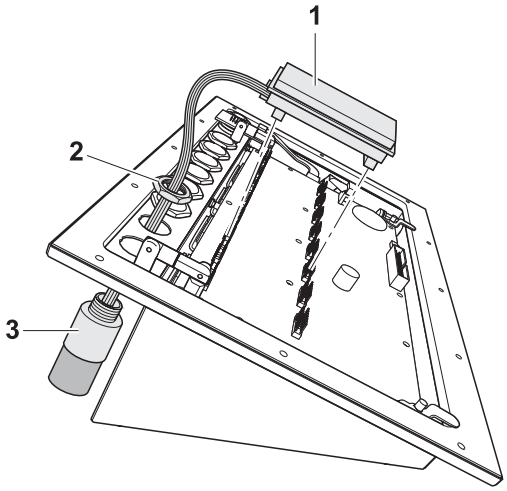
1. Insert the antenna cable (1) into the socket marked "SEC" on the WLAN card.
2. Secure the WLAN cable with the clip (2).

4.7 Installing Bluetooth-690

Scope of delivery

- Bluetooth module with threaded ring and ribbon cable for connecting to the PCB adapter
- Hexagon nut
- PCB adapter: PCB for connecting to the main PCB

Mounting



1. Select the interface connection in accordance with the table on Page 11.
2. Remove the blind plug from the desired interface connection.
3. Insert the Bluetooth module (3) with the ribbon cable facing forwards from the outside through the hole.
4. Insert the hexagon nut (2) from the inside and screw the Bluetooth module onto it and tighten.
5. Insert the PCB adapter (1) into a free slot of the main PCB. Ensure proper poling of the PCB: the arrow on the PCB must point toward the sockets.
6. Connect the ribbon cable connector to the PCB adapter socket.

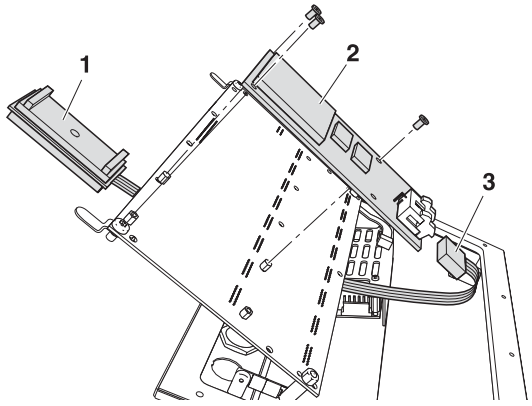
4.8 Installing AlibiMemory-690

Scope of delivery

- AlibiMemory card
- PCB adapter: ribbon cable with PCB for connecting to the main PCB

Mounting

AlibiMemory-690 occupies only an internal interface connection.



1. Select the installation position of the AlibiMemory card in accordance with the installation scheme on Page 13.
   Mounting on the underside of the main PCB (Slot 1) is shown in the graphic.
2. Clip 3 LP distance bolts on the AlibiMemory card.
3. Mount the AlibiMemory card (2) with 2 screws on the underside of the main PCB.
4. Insert the PCB adapter (1) into a free slot of the main PCB. Ensure proper poling of the PCB: the arrow on the PCB must point toward the sockets.
5. Lay the ribbon cable to the underside of the main PCB and connect the connector (3) of the ribbon cable to the socket on the AlibiMemory card.

4.9 Closing terminal

Closing the desk unit

1. Connect the display and keyboard cables to the main PCB.
2. Put the cover on.
3. Turn the device around carefully and screw the 12 screws on the cover underside.
4. At the IND690xx fit the securing clamp.

Closing the panel unit

1. Connect the display and keyboard cables to the main PCB.
2. Fit the cover.
3. Screw on the 2 nuts.

Configuring interfaces

➜ After mounting has been completed, configure the installed interfaces in the INTERFACES master mode, if appropriate. See the IND690-Base operating instructions.

5 Technical data

5.1 Technical data of terminal

IND690	
Display	• Active, luminous, green VFD dot matrix display, suitable for graphics, 40 x 170 pixels, display field 135 x 46 mm • Weight display BIG WEIGHT® display with 35 mm high digits • Cover made of scratch-resistant hardened glass or plastic, antireflection coating
Keyboard	• Tactile-touch membrane keypad with acoustic acknowledgement • Scratch resistant labelling, 3 colours • 6 keys A to F for identification data, 6 function keys, 4 scales function keys, numeric input block, navigation keypad • Alphanumeric input with the function keys possible
Housing	• Completely chrome nickel steel DIN X5 CrNi 1810 • Weight: gross approx. 5 kg, net approx. 4.2 kg (desk unit) gross approx. 7 kg, net approx. 4.7 kg (panel unit)
Protection type (IEC 529, DIN 40050)	• Desk unit and front of panel unit: dust-tight and resistant to high-pressure and steam jet cleaning in accordance with IP69K
Mains connection	• 100 V – 240 V, +10/–15 %; 50/60 Hz • Power cable with earthing-pin plug, length approx. 2.5 m • Power consumption approx. 60 VA
Environmental conditions in accordance with EN 60950	• Pollution severity 2 • Overvoltage category II • Maximum operating altitude: 2000 m above sea level
Ambient temperature	• During operation: –10 … + 40 °C for weighing platforms of the Verification class III 0 … + 40 °C for weighing platforms of the Verification class II • Storage: –25 … + 60 °C
Relative humidity	20 % – 80 %, non-condensing
Weighing platform connections	• 4 weighing platform connections of the type IDNet-690, AnalogScale-690 or SiCS-Scale-690 possible • All METTLER TOLEDO weighing platforms that have the corresponding signal outputs can be connected
Interface connection	1 standard RS232 connection, max. of 8 further interface connections possible
Total load of all output voltages at IND690	Output voltage 5 V max. 600 mA Output voltage 12 V max. 200 mA Output voltage 24 V max. 100 mA

IND690xx	
Display	• Active, luminous, green VFD dot matrix display, suitable for graphics, 40 x 170 pixels, display field 135 x 46 mm • Weight display BIG WEIGHT® display with 35 mm high digits • Cover made of scratch-resistant hardened glass, antireflection coating
Keyboard	• Tactile-touch membrane keypad with acoustic acknowledgement • Scratch resistant labelling, 3 colours • 6 keys A to F for identification data, 6 function keys, 4 scales function keys, numeric input block, navigation keypad • Alphanumeric input with the function keys possible
Housing	• Completely chrome nickel steel DIN X5 CrNi 1810 • Weight: gross approx. 5 kg, net approx. 4.2 kg (desk unit) gross approx. 7 kg, net approx. 4.7 kg (panel unit)
Protection type (IEC 529, DIN 40050)	• Desk unit and front of panel unit: dust-tight and resistant to high-pressure and steam jet cleaning in accordance with IP69K
Mains connection	• 100 V – 240 V, +10/–15 %; 50/60 Hz • Power cable with open lead ends, length approx. 2.5 m • Power consumption approx. 70 VA
Ambient conditions in accordance with EN 60950, EN 60079-15, EN 50281 and IEC 60079-15	• Hazardous area Zone 2: Device category II 3 G EEx nAL [L] IIC T4 • Hazardous area Zone 22: Device category II 3 D T+70°C IP69K • Pollution severity 2 • Overvoltage category II • Maximum operating altitude in m above sea level: 2000 m above sea level
Ambient temperature	• During operation: –10 ... + 40 °C for weighing platforms of Verification class III 0 ... + 40 °C for weighing platforms of Verification class II • Storage: –25 ... + 60 °C
Relative humidity	20 % – 80 %, non-condensing
Weighing platform connection	• 3 weighing platform connections of the type IDNet-690, AnalogScale-690 or SICS-Scale-690 possible • Only weighing platforms approved for Ex Zone 2 and 22 may be connected.
Interface connection	1 standard RS232 connection, max. of 8 further interface connections possible. Only peripheral devices may be connected to the IND690xx for which it is ensured that no higher voltages are fed in than it produces. The interface parameters have to fulfill the respective standard. **Observe the maximum permissible total capacitance and total inductance of all devices connected to 5 V, see last line of this table.**

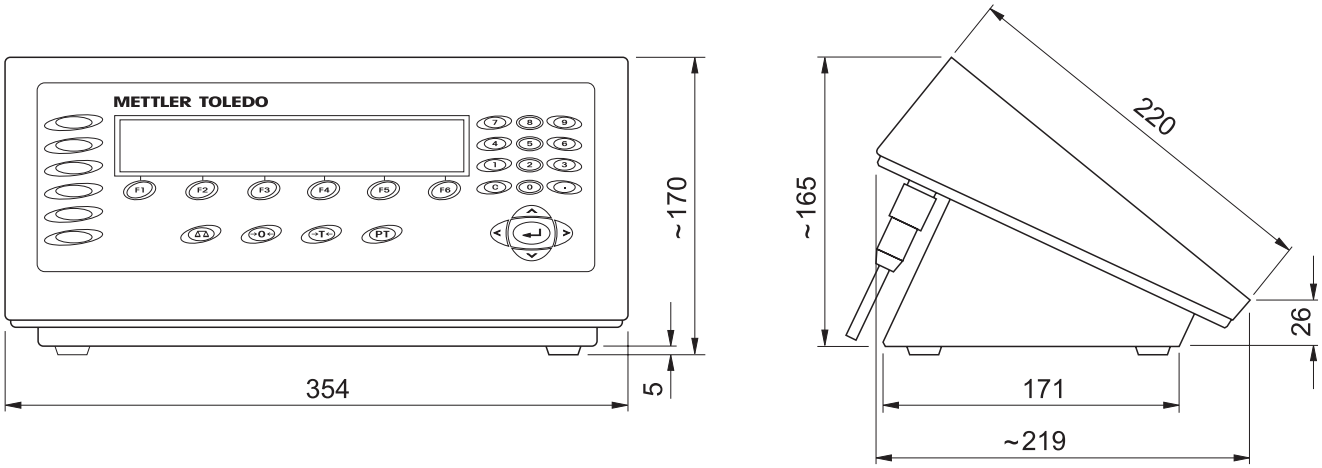
IND690xx		
External loading of all output voltages on IND690xx	5 V output voltage	depending on the design level (see Page 12) max. 100 .to 300 mA, energy-limited
	12 V output voltage	max. 200 mA
	24 V output voltage	max. 100 mA
Maximum total connected values	Maximum connected values of all external devices including cables that will be connected to 5 V.	
	• Total capacity parallel on 5 V	C_o = **max. 200 µF**
	• Total inductance in series on 5 V	L_o = **max. 60 µH**
	• Total current consumption on 5 V	depending on the design level (see Page 12) **max. 100 ... 300 mA**

IND690-24V	
Display	• Active, luminous, green VFD dot matrix display, suitable for graphics, 40 x 170 pixels, display field 135 x 46 mm • Weight display BIG WEIGHT® display with 35 mm high digits • Cover made of scratch-resistant hardened glass or plastic, antireflection coating
Keyboard	• Tactile-touch membrane keypad with acoustic acknowledgement • Scratch resistant labelling, 3 colours • 6 keys A to F for identification data, 6 function keys, 4 scales function keys, numeric input block, navigation keypad • Alphanumeric input with the function keys possible
Housing	• Completely chrome nickel steel DIN X5 CrNi 1810 • Weight: gross approx. 5 kg, net approx. 4.2 kg (desk unit) gross approx. 7 kg, net approx. 4.7 kg (panel unit)
Protection type (IEC 529, DIN 40050)	• Desk unit and front of panel unit: dust-tight and resistant to high-pressure and steam jet cleaning in accordance with IP69K

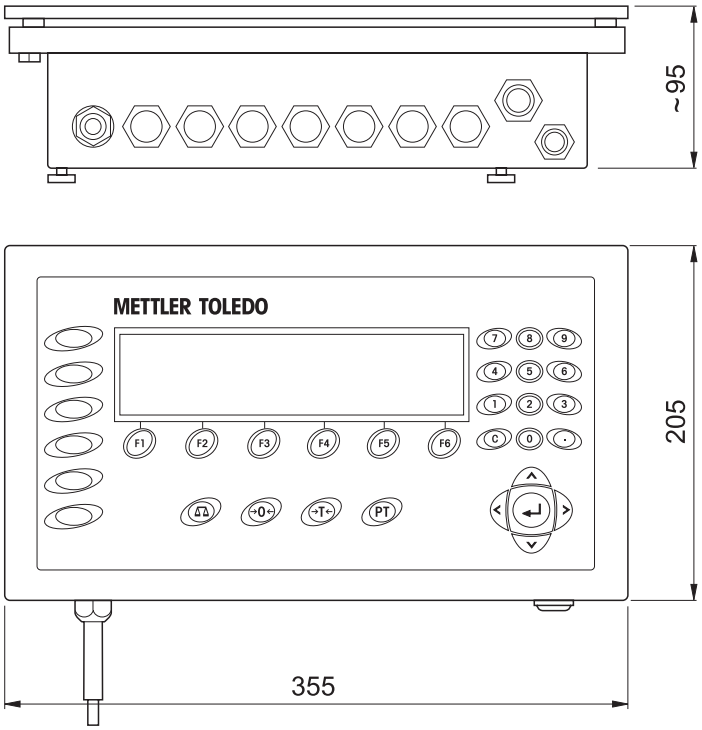
IND690-24V	
Power supply	• 24 VDC SELV power circuit in accordance with EN 60950 • 24 VDC, +20/–15 % in mains operation • 24 VDC, +20/–12.5 % in storage battery operation • Power cable with open ends, length approx. 2.5 m • Power consumption approx. 12 – 58 VA, depending on the design level • Current consumption approx. 0.5 – 2.5 A, depending on the design level • Acoustic signal in storage battery operation, if the supply voltage drops below 22.5 V • Automatic switch-off of the IND690-24V in storage battery operation, if the supply voltage drops below 21 V • 8-hour storage battery: 7 to 20 Ampere-hours, depending on the design level
Environmental conditions in accordance with EN 60950	• Pollution severity 2 • Overvoltage category II • Maximum operating altitude: 2000 m above sea level
Ambient temperature	• During operation: –10 … + 40 °C for weighing platforms of the Verification class III 0 … + 40 °C for weighing platforms of the Verification class II • Storage: –25 … + 60 °C
Relative humidity	20 % – 80 %, non-condensing
Weighing platform connections	• 3 weighing platform connections of the type IDNet-690, AnalogScale-690 or SICS-Scale-690 possible • All METTLER TOLEDO weighing platforms that have the corresponding signal outputs can be connected
Interface connection	1 standard RS232 connection, max. of 8 further interface connections possible
Total load of all output voltages at IND690-24V	Output voltage 5 V max. 100 … 300 mA depending on the design level (see Page 12) Output voltage 12 V max. 200 mA Output voltage 24 V max. 100 mA

5.2 Dimensional drawings

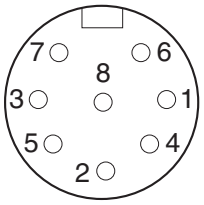
Desk unit



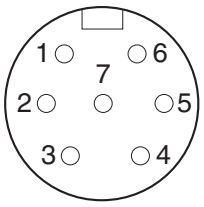
Panel unit



5.3 Technical data for interfaces

COM1 / RS232-690 interface	
Type of interface	Voltage interface in accordance with EIA RS232C/DIN 66020 (CCITT V.24/V.28)
Control signals DTR, DSR	• Signal level 0 (for R_L > 3 kΩ): –3 V – –25 V (low level) • Signal level 1 (for R_L > 3 kΩ): +3 V – +25 V (low level)
Data lines TXD, RXD	• Signal level 0 (for R_L > 3 kΩ): +3 V – +25 V (low level) • Signal level 1 (for R_L > 3 kΩ): –3 V – –25 V (low level)
Interface parameters	Operating mode full duplex Transmission type Bit serial, asynchronous Transmission code ASCII Data bits 7/8 Stop bits 1/2 Parity Parity even, Parity odd, Parity space, Parity mark, No parity Baud rate 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 baud
Socket  External view	8-pin circular plug, socket Pin 1 earth Pin 2 TXD, scales transmission line Pin 3 RXD, scales reception line Pin 4 DTR, Data Terminal Ready Pin 5 +5 V (factory setting) depending on the design level (see Page 12) max. 100 ... 250 mA – or – +12 V, max.100 mA To configure Pin 5, see Section 3.4 (COM1) or 4.2.2 (COM2 ... COM9) Pin 6 Signal earth Pin 8 DSR, Data Set Ready
Cable	• Shielded, twisted pair, max. 15 m • Line resistance ≤ 125 Ω/km • Line cross-section ≥ 0.14 mm^2 • Line capacity ≤ 130 nF/km

AnalogScale-690 analog weighing platform connection	
IND690 / IND690-24V weighing platforms that can be connected	METTLER TOLEDO weighing platforms with AnalogScale interface
IND690xx weighing platforms that can be connected	Weighing platforms with AnalogScale interface approved for use in Zone 2 and Zone 22
A/D converter	Resolution verifiable max. 7500e Resolution not verifiable max. 450000 d DMS supply voltage 8.75 V Minimum numerical increment (certified) 0.58 µV/e Minimum numerical increment (non-certified) 0.058 µV/e Settling time, typical 0.6 s Measured-value change Selectable in steps, max. 20/s
Outside purchased scales	1 – 4 350-Ω weighing cells; 1 – 8 1000-Ω weighing cells Platform sensitivity 0.4 – 3 mV/V Platform resistance 80 – 1200 Ω

CL20mA-690 interface	
Type of interface	• 20 mA current loop, 2 transmission loops • Active or passive operation, settings see Section 4.2.1 • Signal level 0: 20 mA • Signal level 1: 0 mA • Electrical isolation only in passive configuration and up to U = 30 VAC, Û = 42 V, U = 60 VDC
Interface parameters	Operating mode Full duplex Transmission type Bit serial, asynchronous Transmission code ASCII Data bits 7/8 Parity Even, odd, zero, one, none Baud rate 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 baud
Transmission and/or reception loop passive	One external power source supplies the transmission and/or reception loop $I_{ma}x$ 30 mA $U_{m}ax$ 27 V Voltage range 15 V (+10 % / –0 %) Current level 18 mA – 24 mA (high level) Edge steepness 2 – 20 mA/µs To set operating mode, see Section 4.2.1
Transmission and/or reception loop active	One internal power source supplies the transmission and/or reception loop Voltage 12 VDC Current Adjusted to ±2 mA, for transmission and/or reception loop To set operating mode, see Section 4.2.1
Socket  External view	7-pin circular plug, socket Pin 1 RXD+, receiver Pin 2 RXD–, receiver Pin 4 TXD+, transmitter Pin 5 TXD–, transmitter Pin 7 Protective earth
Cable	• Shielded, twisted pair • Line resistance ≤ 125 Ω/km • Line cross-section ≥ 0.14 mm^2 • Line capacity ≤ 130 nF/km • max. 1000 m for baud rates up to 4800 baud • max. 600 m for 9600 baud • max. 300 m for 19200 baud

RS485/422-690 interface

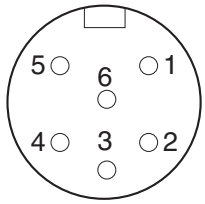
Type of interface

- Bi-directional differential-mode voltage interface
- Electrical isolation by optocoupler
- For reconfiguring of RS485/RS422 see Section 4.2.3

Interface parameters

Operating mode	Full duplex, point-to-point connection, bus
Transmission type	Bit serial, asynchronous
Transmission code	ASCII
Data bits	7/8
Parity	Even, odd, zero, one, none
Baud rate	150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 baud

Socket



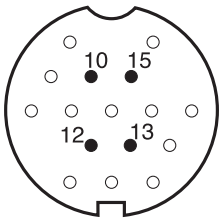
External view

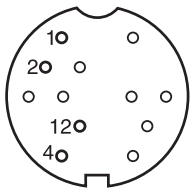
6-pin circular plug, socket

	RS422	**RS485**	**Cable 00 204 933**
Pin 1	GND electrically isolated	GND electrically isolated	white
Pin 2	+5 V, max. 100 mA electrically isolated	+5 V, max. 100 mA electrically isolated	brown
Pin 3	TXD+	TXD+ / RXD+	green
Pin 4	TXD–	TXD– / RXD–	yellow
Pin 5	RXD–	not assigned	pink
Pin 6	RXD+	not assigned	grey

Cable

- Shielded, twisted pair, max. 1200 m
- Line resistance ≤ 125 Ω/km
- Line cross-section ≥ 0.14 mm^2
- Line capacity ≤ 130 nF/km

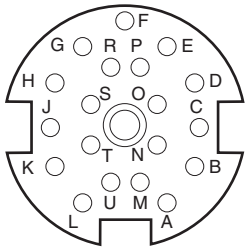
USB-690 interface	
Type of interface	• USB, Universal Serial Bus • Standardized interface between PC and peripherals • Version 1.1
Interface parameters	• Transfer rate up to 57600 baud • Connection during running operation
Socket  External view	16-pin circular plug, socket Pin 12 +5 V, max. 100 mA Pin 10 D– Pin 15 D+ Pin 13 GND

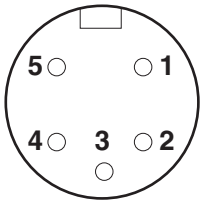
Ethernet-ID7	
I/O Com server	• Network: 10/100BaseT • Electrical isolation: min. 500 V to network connection • Configuration – in master mode IND690 – alternatively via Telnet, per browser (Web Based Management) – or by using the inventory and management tool WuTility • Protocols: TCP/IP, FTP, UDP and other • For additional information, see the CD-ROM or www.WuT.de
Socket  External view	16-pin circular plug, socket Pin 1 TX+ Pin 2 TX– Pin 4 RX– Pin 12 RX+

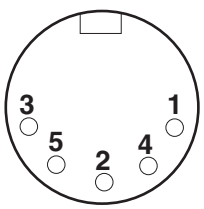
ProfibusDP-690 field bus module	
Connection to the field bus	• RS485-DP connection via removable Mini-Combicon terminal bar • 2 EMC cable entry fittings for incoming or outgoing field bus cable with a diameter of 7 – 8 mm
Baud rate	up to 12 Mbit/s
Matching resistor	connectable via 3 DIP switches All 3 switches closed if ProfibusDP-690 is the last node in a Profibus line, otherwise all switches open.
Node address	adjustable to between 001 and 126 in master mode Factory setting: 126
Data width	2/4 IN and 2/4 OUT words, consistent for 2 words at operating mode 16-bit integer or for 4 words at operating mode 32-bit floating point Optional 8 IN/OUT words (only for Sys-690)
Status displays	• 4 status LEDs provide information on operating state • Test operation shows user data on display
Supported Profibus version:	DP-V0
Certificate	PNO Z00756
GSD	IND6_053C.gsd
Current consumption	260 mA

WLAN-690	
Data transfer	WLAN IEEE 802.11b, 11 Mbit/s, 5.5 Mbit/s, 2 Mbit/s, 1 Mbit/s
Frequency	2,4 GHz (ISM band)
Protocols	ARP, ICMP, TCP/IP, UDP/IP
Encryption	WEP, 64 bit or 128 bit
Transmission power	Typ. 15 dBm (30 MW)
Sensitivity (BER<10^{-5})	Typ. –84 dBm at 11 Mbit/s Typ. –87 dBm at 5.5 Mbit/s Typ. –90 dBm at 2 Mbit/s Typ. –93 dBm at 1 Mbit/s
Current consumption	Typ. 300 mA, max. 400 mA

Bluetooth-690	
Bluetooth specification	V1.2
Max. RF transmission power	16 dBm (Class 1)
Typ. reception sensitivity	–86 dBm
Range	approx. 100 m
Current consumption	max. 100 mA / 3.3 V

4I/O-690 interface	
Digital inputs/outputs	• 4 digital inputs, electrically isolated, I = 5 mA (internal current limiting) • 4 digital outputs, electrically isolated, Open Collector • I_{max} = 20 mA per output • $I_{max\ total}$ = 80 mA for the 4I/O-690 interface module
Supply voltage	internal 24 V (I_{max} = 80 mA), external 5 V – 36 V; settings see Section 4.2.4
Signal level	• Logic 0 = not powered • Logic 1 = powered
Socket  External view	19-pin circular plug, socket **4I/O-690** / **Cable 00 504 458** / **Relay box 4-690 Terminal 1** Pin A, L +24 V, max. 80 mA — black — 24 V — Pin 7, 8 Pin B Output 1, max. 20 mA — white — OUT 0 — Pin 4 Pin C Output 2, max. 20 mA — brown — OUT 1 — Pin 3 Pin D Output 3, max. 20 mA — green — OUT 2 — Pin 2 Pin E Output 4, max. 20 mA — yellow — OUT 3 — Pin 1 Pin M, U 0 V — violet — 0 V — Pin 5, 6 Pin N Input 1 — grey/pink — IN 0 — Pin 12 Pin O Input 2 — red/blue — IN 1 — Pin 11 Pin P Input 3 — white/green — IN 2 — Pin 10 Pin R Input 4 — brown/green — IN 3 — Pin 9
Total load of all output voltages	max. 80 mA
Cable	• 16 conductors • Cross-section 0.25 mm^2 • Max. cable length 10 m

AnalogOut-690 interface	
Digital-Analog converter	For outputting analog direct voltage or DC current signals
Analog voltage output	V_{out} 0 – 10 V (16383 steps) Start and stop value of output voltage and output weight value freely selectable R_{Vout} >10 kΩ Cable max. 10 m
Analog current output	I_{out} 0 – 20 mA (16383 steps) 4 – 20 mA (13106 steps) Start and stop value of output current and output weight value freely selectable R_{Iout} <250 Ω Cable max. 50 m
Characteristics	Resolution 14 bit Error +/– 1/2 % (current/voltage)
Application	All data present in a valid weight unit can be used as a data basis for the analog output.
Socket  External view	5-pin circular plug, socket **Analog Output-690** / **Wire colors Cable 00 204 930** Pin 1 V out Analog output voltage green Pin 2 0 V (V out) Reference potential yellow Pin 3 I out + Analog current output, positive brown Pin 4 I out – Analog current output, negative pink Pin 5 0 V(V out) Reference potential white

PS2-690	
Connection of external keyboards	• MFII keyboards directly • PS/2 keyboards via adapter
Country variants	Different keyboard layouts can be set in master mode
Socket  External view	5-pin circular plug, socket Pin 1 Cycle line Pin 2 Data line Pin 3 Not assigned Pin 4 GND Pin 5 +5 V, max. 100 mA

AlibiMemory-690	
Storing of calibration-relevant weighing data	• Paperless archiving of calibration-relevant weighing data • Capacity: up to 675500 records with net and tare weight, time and date, scales number, MinWeigh, tare source as well as additionally configurable data • Comfortable search function and print-out option • Ring data storage that overwrites the oldest record when the storage capacity is exceeded

6 Accessories

Scales connections		Order number
IDNet-690	• Scales connection for IDNet scales	22 011 951
AnalogScale-690	• Scales connection for analog weighing platforms	22 011 952
SICS-Scale-690	• Scales connection for SICS scales	22 011 953
	• Connection cable for RS232 SICS scales with 9 pin Sub-D connector	22 006 795
	• Connection cable for LabTec X scales with voltage supply via IND690	22 015 128

Serial interfaces		Order number
CL20mA-690	• CL20mA interface, 7-pin socket	22 011 954
	• CL cable, 3 m	00 503 749
	• Mating plug, 7-pin	00 503 745
RS232-690	• RS232 interface, 8-pin socket	22 011 955
	• RS232 cable/DTE, 3 m	00 503 754
	• RS232 cable/DCE, 3 m	00 503 755
	• RS232 cable/PC, 3 m	00 504 374
	• RS232 cable/9-pin, 3 m	00 504 376
	• Mating plug, 8-pin	00 503 756
RS485/422-690	• RS485/422 interface, 6-pin socket, electrically isolated	22 011 956
	• RS422/485 cable, open end, 3 m	00 204 933
	• Extension cable for RS422/485, 10 m	00 204 847
	• Mating plug, 6-pin	00 204 866
Bluetooth-690	• Cable-less serial interface, antenna integrated	22 011 958
USB-690	• USB slave	22 011 959
	• USB adapter cable, 3 m	22 015 326
PS2-690	• PCB adapter for MFII/PS2 keyboard connection	22 011 960
	• Connecting cable adapter for PS/2 keyboards, **IP21 only**	22 011 969
	• Protected plug for own fabrication, IP65	22 011 970

Network interfaces		**Order number**
Ethernet-690	• Ethernet10/100 Base T, twisted pair, 8-pin socket	22 011 961
	• Twisted-pair cable, 8-pin, RJ45, 5 m	00 205 247
	• Twisted-pair cable, 8-pin, RJ45, 20 m	00 208 152
WLAN-690	• Radio network, with stub antenna	22 011 962
ProfibusDP-690	• Field bus connected, for direct internal termination, incl. 2 x PG11 cable bushing	22 011 963

Digital I/O interfaces		**Order number**
4I/O-690	• 4 inputs / 4 outputs, 19-pin socket	22 011 965
Relay box 4-690	• Relay box with 4 inputs and 4 outputs, for connection to 4I/O-690	22 011 967
	• Cable for connecting 4I/O-690 to the relay box, 10 m	00 504 458
	• Mating plug, 19-pin	00 504 461
Relay box 8-690	• Relay box with 8 inputs and 8 outputs, for connection to RS485/422-690	22 011 968
ARM100	• 4 inputs / 6 outputs, for connection to RS485/422-690	71 209 352

Alibi memory		**Order number**
AlibiMemory-690	Paperless archiving of certification-relevant weighing data	22 011 950

Mechanical accessories for desk version		**Order number**
Wall bracket	• for mounting the weighing terminal to the wall, stainless	22 011 980
Floor stand	• for free installation of the weighing terminal, stainless	22 011 981
Stand base	• for movable installation of the floor stand, stainless	22 011 982
Bench stand	• for mounting the weighing terminal to the weighing bench, stainless	22 011 986
Stand adapter	• Retrofitting set for "old stands", exception scale stand 00 504 439, stainless, mounting on the weighing platform not allowed	22 011 984
GA46 adapter	• for mounting the GA46 printer to the floor stand or the wall bracket**, not for IND690xx**	22 011 985
Protective hood	• transparent, 3 pc.**, not for IND690xx**	22 011 983

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